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Restyling Service—A New Development in Merchandising

By GORDON ARMSTRONG

Assistant to the President,
The Youngstown Pressed Steel Co., Warren, Ohio

CUSTOMERS who look ahead refuse to stand still. They are like globules of quicksilver held in the palm of the hand—a little clumsy handling and they slip through the fingers to be lost. They are like men passing on parade—a few moments of wool-gathering and the parade has disappeared around a corner where the competitor sits.

For many years our company has been redesigning various raw materials into pressed metal. It is a constructive service. It has enjoyed a healthy acceptance. But industry never rests. It shifts and moves as constantly and incessantly as the ticking of a clock or the dropping of water.

A generation ago equipment and the ability to produce were almost enough to keep a manufacturer alive. The procession moved on and it became necessary to redesign. It is still moving. Today productive capacity and redesign combined are not enough. Products must be styled.

Any styling is rapidly assuming an important place in American industry. But, because it is a relatively new factor in manufacturing programs, it is causing much grief. Heavy losses can be incurred by selecting the wrong stylist. It doesn't follow that because an artist excels in designing packages that he is qualified to style a mechanical product having moving parts. Another difficulty lies in the fact that stylists do not speak the same language as production men and do not easily accommodate themselves to the realities of plant problems. They do not readily adapt their

work to the requirements of practical engineering design. Of the creative type, they are ever conscious of their dependence on ideas and inspirations which have no relation to time. They are therefore reluctant to bind themselves to completion of a job within fixed time and money limits.

It was for the purpose of taking the guesswork out of styling that our company undertook to act as the go-be-

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IN AN interview published in THE IRON AGE of Dec. 29, 1932, Mr. Armstrong made a strong case for restyling as a major factor in future merchandising programs. In this article he describes a restyling service that he has developed in his own company. Manufacturers taking advantage of this service are relieved of the difficulties of bargaining with an artist, of persuading him to produce the design desired and finally of translating his representation into practical mechanical drawings. The service, moreover, is rendered under contract stipulations to provide a given design within definite money and time limitations.

The current article is the eleventh in our general series devoted to Modern Merchandising and Marketing in the Metal-Working Industry.

tween the artist and the manufacturer. As a matter of service, our organization contracts to furnish both the styling and the engineering that will make it practical and—what is more important—agrees to furnish the service for a specified sum and within a specified time.

How this service is rendered can be best explained by recounting the various steps taken by our organization in the restyling of a credit register for use in retail stores which have charge accounts. This product was redesigned by Henry Dreyfuss, New York, nationally known product stylist. A credit register, it will be observed, is a utilitarian product; it is not manufactured for personal consumption; it does not appeal to the same motives of pride or vanity that influence the purchase of an automobile or a radio. It is therefore significant of the progress of styling and points to the growth of its importance in many products which are now sold solely on the basis of their usefulness.

The styling of the credit register was done in cooperation with Youngstown Pressed Steel Co. engineers. Their job was to do the detailing and to see to it that progress in developing the new design went forward according to schedule.

Definite Procedure Followed

A definite procedure was laid out which can be followed in any styling job. This plan calls for 12 to 15 steps, which are put on a production basis.

The first step is for the creative artist and an engineer from our or-



AT THE left, the old register. At the right, the new model. The leaves of the new register, unlike those in the old one, have no feet and hence do not scratch the base. The new model, moreover, has identifying numbers at an angle on the upper corners of the leaves so that an operator may work at the register either standing up or sitting down.

ganization to visit the client's plant and go over the whole problem of what the manufacturer wants to do and why he wants to do it. Then our organization carries on a trade investigation, calling on users of the manufacturer's product in different parts of the country. In this way we ascertain the users' objections to the present style and the suggestions they may have for a new model. Invariably we uncover viewpoints that the client does not know exist. This is not surprising because buyers as a rule are prone to criticize in the presence of a salesman. They are reluctant to praise or to offer constructive suggestions for fear of sales pressure or a price advance. In the hands of a trained investigator, however, they will talk more frankly, frequently divulging confidential information which they would not impart to a manufacturer's representative.

Following the market investigation, the artist carries on an independent study among an entirely different set of users, covering angles of design that he is particularly interested in.

Service Director Coordinates Work

To serve as a clearing house for all information and as a go-between for the artist, engineer and client the

Youngstown Pressed Steel Co. assigns one of its men to the whole job as a service director. He coordinates all information so that both the artist and the engineer get the benefit of their combined findings and, when the assembled data have reached the point where they contain real meat, passes them on to the client. Incidentally he prepares the client for proposed changes in design.

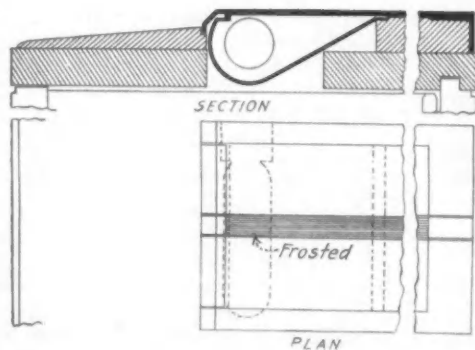
After all information has been assembled, the designer may make from a dozen to 50 rough sketches embodying different restyling ideas, some practical and some impractical. Then the service director calls stylist, engineer and client into conference. At this time all disagreements and suggestions are threshed out. It is important that this be done while the project is still in the plastic stage because at that juncture anything can be changed. The conference saves the engineer's time and the artist's time and gives the client a finger in the pie, to which he is entitled. It protects the client from the disappointment of having a design submitted which he knows from his knowledge of the business would be impracticable.

Each member of this conference has a different function. The service director is there to see that the conference makes progress and doesn't go astray on inconsequential matters. He must act as a sort of arbitrator and see that a definite understanding is reached. The artist is there to determine whether the ideas decided on are feasible from a pure styling point of view. The engineer must decide whether the design can be put on a practical production basis. The client, who has an intimate knowledge of the market, will determine whether the suggestions made have merit from a merchandising point of view. No matter how beautiful or practical a product may be it has no value unless it can be sold. The client's judgment on this point is necessary. In fact, he must accept the responsibility for this feature of the design. For this reason the client is often represented by both the president and the sales manager.

The next stage is the making of the artist's final drawing, although this step may be preceded by another conference at which more nearly completed "roughs" are submitted. Final submission of the design must not be made until all concerned are sure that the client is satisfied. The formative stage, prior to submission, is the most critical period. It is at this point that the service director can do the most good.

Following acceptance of the artist's completed design, the engineer has mechanical drawings made. These are not always detailed but at least include an assembly, to make sure that, when drawn to scale, the product does go together, and does function and look like the artist's representation. As a matter of fact, it doesn't always work

(Concluded on Advertising Page 10)



SECTION and detail plan of the base of the credit register. A concealed incandescent lamp in a chamber in the base of the register transmits light through a superimposed strip of glass into the leaves of the register. In the old model a lamp was carried on a standard above the register.

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A PROCESS, known as the Dudzele, which is claimed to overcome some of the disadvantages of present-day methods of cold-drawing tubes, rods and wire of carbon and alloy steels, is described in this article. A lead coating on the material to be cold-worked is the feature—it acts as a lubricant and is said to reduce the number of annealings, picklings, etc., between draws. Some typical plant results are furnished. The process is being used in the United States and foreign countries.

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New Process for Cold Drawing of Metals

By DR. C. L. MANTELL

Consulting Engineer,
Pratt Institute,
Brooklyn.

THE last five years have witnessed the adoption in the United States, England, France, Germany, Italy, and other industrial European countries, of an interesting and economical method of cold-drawing of tubes, rod and wire. This method, known as the Dudzele process, presents a number of advantages and possibilities over the normal method.

In tube and wire drawing, according to present-day normal practice, the work-hardening effect of the passage through a die usually necessitates annealing with its accompanying pickling and washing after every pass. In the case of tubing, wire, or rod drawing, the annealing operations are necessarily expensive, while pickling, although not so costly, causes metal loss through solution of the metal in the pickling acids. It is obvious that, were a greater number of draws permissible without annealing, many of the annealing and pickling operations would be eliminated. The Dudzele process permits a number of drawing operations without an annealing and pickling following each draw.

Details of the Process

As operated in the United States and abroad, the tubes are pickled as in ordinary practice in 4 to 5 per cent sulphuric acid solution at 160 to 180 deg. F. for carbon steels, and in other acids for the alloy steels. After pickling, the tubes are washed and either allowed to dry and then amalgamated, or else directly amalgamated in a solution of mercuric chloride. After amalgamation the tubes are allowed to dry and are then transferred to a lead coating tank which is covered with a flux of molten metallic chlorides. The tubes are covered with flux and then passed down into the bath of molten lead, maintained, depending upon the character of the tube and its composition, at temperatures of the order of 700 to 800 deg. F. When they have reached the same temperature as the lead in the bath, they are worked down through a baffle in the center so that they rise

through the lead on the other side, whence they are drawn out of the lead bath, excess metal drained and wiped off by the use of asbestos rope held in a clamp.

The tubes are now ready for the drawing operation. They have a pleasing silvery appearance. The lead acts as a solid lubricant of very high viscosity. The coating acts more or less in the nature of a cushion when drawing takes place and permits the actual metal to be drawn under the coating. Roughing of the tube against the die, an ordinary occurrence under usual conditions, is entirely prevented.

Removing the Lead

After the tubes have been drawn and work-hardened to the maximum point of safety, the lead must be removed preparatory to annealing. The miscellaneous dirt and other materials on the surface of the tube are removed in an alkali cleaner, and the tubes de-leaded in acid baths in a manner similar to the operation of pickling. The lead is completely and entirely removed from the inside and outside of the tube. Plant tests have shown that if a foot section were taken from the center of a 20-ft. tube, $\frac{1}{2}$ in. in diameter, which had been lead-coated and drawn, and this foot section were completely treated in the laboratory to dissolve it entirely, tests for lead, sensitive to 1 part in 400,000, fail to show its presence after the de-leading operation. Such completeness of de-leading is ordinary plant practice with the Dudzele method. After the de-leading operation, the tubes are annealed, pickled, washed, and dried.

The economic advantages of the Dudzele process in its savings of annealing and pickling can be readily appreciated and have been demonstrated on a commercial scale in tests in which comparative cost figures were obtained. In industrial practice the method has shown special adaptability to small-size tubing of carbon steel and alloys, alloy wire and rod. It has found special application in the production of decidedly superior finishes on low and high-carbon steels,

rustless steel and iron, and nickel-chromium alloys such as 18 chromium 8 per cent nickel, 4 to 6 per cent chromium steel, as well as alloys such as nickel silver, 25 chromium 20 per cent nickel, Invar (36 per cent nickel steel), 70 copper 30 per cent nickel. Some typical plant results will be given.

Typical Plant Results

On an 18.5 chromium 8.5 per cent nickel steel, tubes 51 mm. outside diameter by 44 mm. inside diameter (2 in. by 1.73 in.) were drawn in six passes without annealing to 41.3 mm. O. D. and 37 mm. I. D. (1.63 in. O. D., 1.46 in. I. D.), after which they were de-leaded, annealed, pickled, and re-leaded to produce a finished tube 35.5 mm. O. D. by 33 mm. I. D. (1.40 in. by 1.30 in.) in four passes without annealing. Tubes of 25 per cent chromium 20 per cent nickel steel, originally 60 mm. O. D. by 53 mm. I. D. (2.36 in. by 2.09 in.) were reduced in three passes without annealing, giving a finished tube 51 mm. O. D. by 46.4 mm. I. D. (2 in. O. D. by 1.83 in. I. D.).

Thirty-six per cent nickel Invar steel tubes were reduced from 30 mm. O. D. by 24 mm. I. D. (1.18 in. by 0.94 in.) in 10 passes, without annealing, to give a finished tube 12.3 mm. O. D. by 10 mm. I. D. (0.47 in. by 0.39 in.) which was de-leaded. Nickel silver tubes 33 mm. O. D. by 24 mm. I. D. (1.30 in. by 0.94 in.) were drawn in nine passes without annealing to 14.2 mm. O. D. by 12 mm. I. D. (0.56 in. by 0.47 in.). Cupro-nickel (70 per cent Cu 30 per cent Ni) was drawn from 61 mm. O. D. by 45 mm. I. D. (2.40 in. by 1.77 in.) in eight passes without annealing to give tubes 20 mm. O. D. by 17.6 mm. I. D. (0.79 in. by 0.69 in.).

In wire drawing, 18 chromium 8 per cent nickel alloy was drawn from 5 gage rod 0.207 in. diameter (5.26 mm.) to 0.102 in. diameter (2.59 mm.), approximately 12.5 gage, without any intermediate annealing, as compared with standard practice which requires three anneals, pickles and washings. The physical properties of this wire showed a maximum tensile of 269,200 lb. per sq. in., an

(Concluded on Advertising Page 12)

Chrome-Nickel Steel for Navy Cast Steel Anchor Chain

By T. N. ARMSTRONG

Norfolk Navy Yard,
Norfolk, Va.

IN 1919 the National Malleable & Steel Castings Co., Cleveland, made the first cast steel anchor chain at its Sharon plant. As the United States Navy required a large tonnage of new chain each year, the Navy department decided to start the manufacture of the chain in one of its own yards so as to have more than one source of supply. The Norfolk Navy Yard was selected as the most suitable on account of its foundry equipment and also because of the reputation this yard had built up for its steel castings. [Early descriptions of the anchor chain appeared in *THE IRON AGE*, July 4, 1918.]

The cast chain has proved so satisfactory in meeting the demand for lighter, stronger chain at a reasonable cost that it has entirely superseded the old welded chain. The Boston Navy Yard has developed a forged chain called Dilok that is now competing with cast steel chain.

The Norfolk Yard at first followed the procedure of the National Malleable & Steel Castings Co. very close-

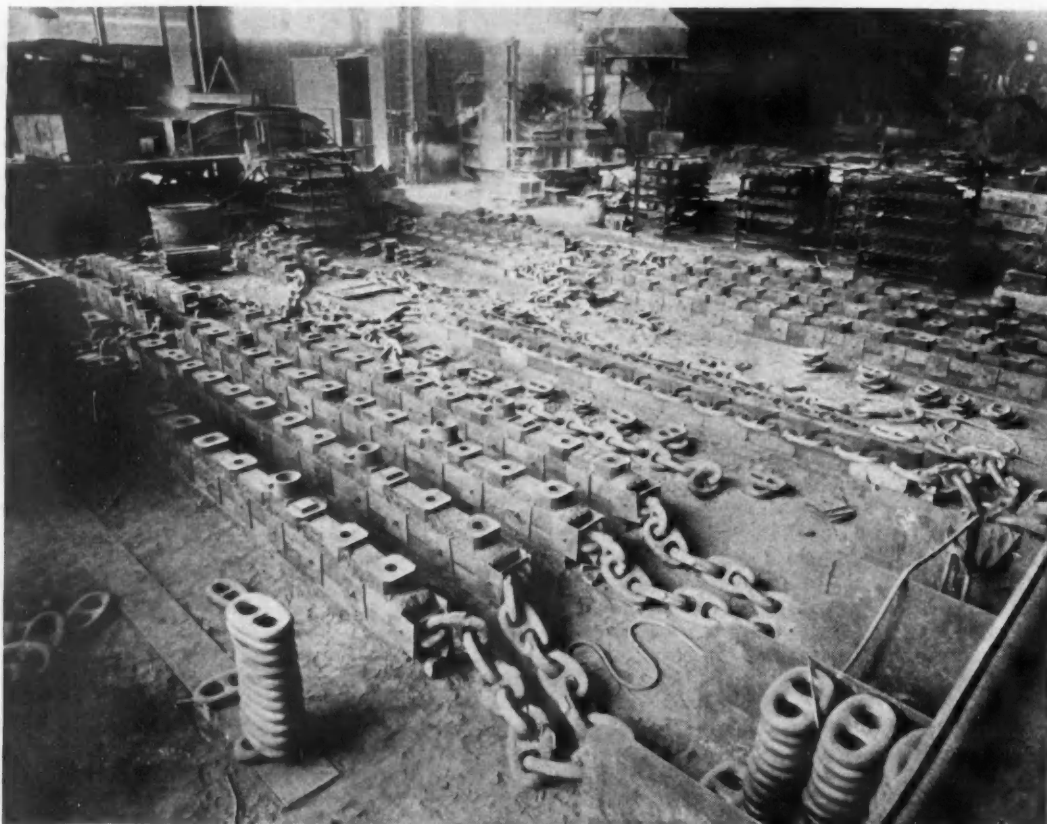
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A NEW type of alloy steel for cast steel anchor chain has been perfected. Its manufacture, properties and heat treatment are described in this article. The chain when first produced was made of medium - manganese steel. The new steel is a nickel-chromium composition.

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ly. A 1.5 per cent manganese, 0.30 per cent carbon steel was used. This composition had been originally selected by National Malleable because it had experienced success with it in castings subjected to excessive abrasion and shock. The Norfolk Yard,

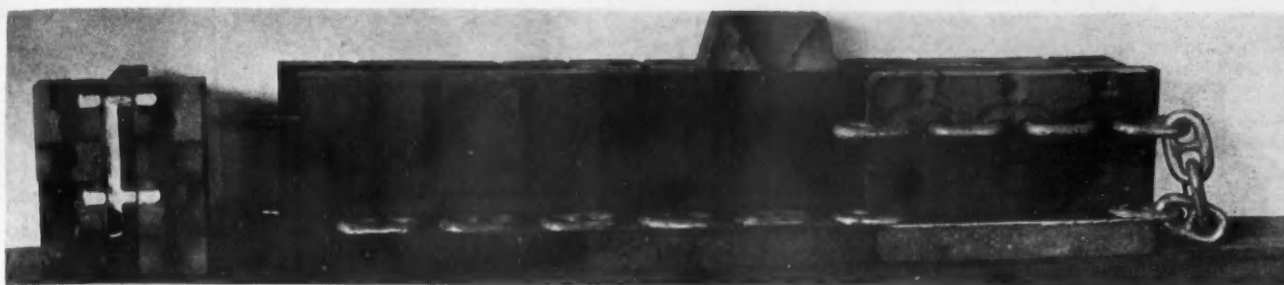
after experimenting with this material for some time, increased the carbon content to 0.35 per cent to obtain a higher tensile strength.

As sizes ranging from ¾-in. to 3-in. wire diameter were cast, it was necessary to establish a treatment that would affect both the large and small size chains. The first treatment practiced was to heat the chain to 1450 deg. F., quench in water and temper (draw) at 1100 deg. This procedure was discarded as the chain did not always react to treatment, owing to the mass, and also because the temperature, although slightly above the critical range, was not high enough to break up the cast structure.

When quenching from a higher temperature was attempted, a large percentage of the small-size chains cracked in the quenching bath. Quenching on a falling temperature was finally resorted to. The metal was heated to 1650 deg., held 3 hr., cooled in the furnace to 1250 deg., held for one hour for each inch of



▲ ▲ ▲
Chain bay of Norfolk
Navy Yard.
▼ ▼ ▼



Precast links in mold for one-inch chain.

thickness, quenched in water and tempered at 1100 deg. This treatment was only fairly successful, as a large percentage of small chain still developed quenching cracks. One per cent nickel was added but very little improvement was noted.

Nickel-Chromium Steel Adopted

Finally it was decided to change the composition entirely. A steel was selected with a composition similar to S.A.E. steel 3135, containing approximately 0.35 per cent carbon, 0.80 per cent manganese, 1.5 per cent nickel, and 0.6 per cent chromium. This is the steel of which the chain is made at Norfolk at the present time.

The heat treatment of the chain had always been one of the most unsatisfactory operations in the whole procedure of manufacture. It was necessary to make steels of slightly different chemical composition meet a certain physical specification when heat treated at the same time in the same furnace. This is particularly difficult when it is necessary to give the low-carbon steel the necessary tensile strength without lowering the ductility of the high-carbon steel beyond the limit required.

Determining the Heat Treatment

To find the most effective treatment for the chrome-nickel chain, 146 bars from one heat containing 0.37 per cent carbon were subjected to 73 different heat treatments. These bars were turned down and pulled in the tensile machine. Two bars were taken to represent each treatment, and, whenever there was doubt as to the results because of variations, a third bar was given that particular treatment and the results obtained compared with those of the other two.

Test coupons from a second heat were cast and subjected to 43 different treatments. This heat contained only 0.31 per cent carbon. The object of duplicating tests with bars from a second heat was an attempt to establish a treatment that would be effective for steels of a maximum and minimum carbon content found in any one shot (15 fathoms) of chain. The steel of the lower carbon content was subjected only to those treatments giving a high tensile strength to the 0.37 per cent carbon steel. Test bars and links were selected at random

from different heats for further investigation.

As the chain is constantly subject to impact and shock in service, a static tensile test is not a good criterion for the material under dynamic stresses. To obtain some idea of the resistance to impact or resilience of the material, bars from three differ-

ent heats were given different heat treatments and tested by three different methods in the impact machine; namely, as Charpy specimens, as Izod specimens, and as tensile impact specimens.

At the conclusion of the test, sections of specimens subjected to different treatments were examined. (Concluded on Advertising Page 10)

Average Results of Some of the Heat Treatments

Averages—Quenched and Drawn 1000 Deg.—on 0.37 Per Cent Carbon Steel

| No. | Elong., Per Cent | Red. Area, Per Cent | Yield, Lb. per Sq. In. | Tensile, Lb. per Sq. In. | Treatment, Deg. F. |
|-------|---------------------|---------------------------|------------------------------|--------------------------------|--|
| A1-A2 | 13.8 | 37.5 | 136,870 | 146,500 | Quenched 1650, drawn 1000. |
| B1-B2 | 12.8 | 31.7 | 138,870 | 149,320 | Quenched 1600, drawn 1000. |
| C1-C2 | 12.5 | 34.1 | 140,400 | 149,920 | Quenched 1550, drawn 1000. |
| D1-D2 | 14.0 | 32.1 | 136,800 | 145,600 | Quenched 1600-1550, drawn 1000. |
| E1-E2 | 12.5 | 32.7 | 141,450 | 148,970 | Quenched 1550-1500, drawn 1000. |
| F1-F2 | 21.5 | 43.3 | 63,310 | 109,020 | Annealed 1650, reheated and quenched 1200, drawn 1000. |
| G1-G2 | 20.0 | 39.6 | 61,620 | 106,750 | Annealed 1650, reheated and quenched 1250, drawn 1000. |
| H1-H2 | 21.7 | 39.7 | 60,040 | 102,720 | Annealed 1650, reheated and quenched 1300, drawn 1000. |
| I1-I2 | 19.5 | 38.0 | 67,320 | 109,170 | Heated 1650, temp. dropped to 1200 and quenched, drawn 1000. |
| J1-J2 | 11.0 | 27.3 | 118,050 | 135,500 | Heated 1650, temp. dropped to 1250 and quenched, drawn 1000. |
| K1-K2 | 13.2 | 31.7 | 135,450 | 147,850 | Heated 1650, temp. dropped to 1300 and quenched, drawn 1000. |
| M3-M4 | 12.2 | 35.0 | 132,870 | 144,870 | Quenched 1550 in oil, drawn 1000. |
| N3-N4 | 10.5 | 32.1 | 146,670 | 155,100 | Quenched 1550 in water at 150, drawn 1000. |
| M1-M2 | 10.0 | 27.3 | 150,320 | 158,960 | Quenched 1550 in oil, drawn 950. |
| N1-N2 | 11.2 | 31.1 | 145,550 | 153,820 | Quenched 1550 in water at 150, drawn 950. |

Averages—Quenched and Drawn 1000 Deg.—on 0.30 Per Cent Carbon Steel

| | | | | | |
|-------|------|------|---------|---------|--|
| O3-O4 | 15.2 | 38.5 | 115,820 | 129,320 | Quenched in water from 1550. |
| P3-P4 | 17.7 | 42.6 | 108,320 | 123,770 | Quenched in water at 150 from 1550. |
| Q3-Q4 | 17.0 | 38.7 | 105,500 | 118,370 | Heated to 1650, temp. dropped to 1300, quenched. |
| S3-S4 | 15.7 | 36.9 | 107,900 | 117,620 | Heated to 1550, temp. dropped to 1300, quenched. |

Averages—Air-Cooled and Drawn 1000 Deg.—on 0.37 Per Cent Carbon Steel

| | | | | | |
|---------|------|------|---------|---------|---|
| A11-A12 | 17.7 | 41.3 | 80,100 | 127,020 | Air-cooled 1650, drawn 1000. |
| B11-B12 | 16.5 | 42.1 | 91,410 | 129,480 | Air-cooled 1600, drawn 1000. |
| C11-C12 | 18.7 | 45.2 | 86,570 | 126,900 | Air-cooled 1550, drawn 1000. |
| F11-F12 | 20.2 | 41.9 | 64,200 | 106,570 | Annealed 1650, reheated to 1200, air-cooled, drawn 1000. |
| G11-G12 | 20.2 | 41.5 | 64,770 | 106,220 | Annealed 1650, reheated to 1250, air-cooled and drawn 1000. |
| H11-H12 | 22.0 | 43.5 | 57,220 | 102,350 | Annealed 1650, reheated to 1300, air-cooled, drawn 1000. |
| I11-I12 | 18.5 | 38.0 | 65,720 | 109,900 | Heated 1650, temp. dropped 1200, air-cooled, drawn 1000. |
| J11-J12 | 16.7 | 40.9 | 95,800 | 128,220 | Heated 1650, temp. dropped 1250, air-cooled, drawn 1000. |
| K11-K12 | 16.7 | 39.1 | 95,750 | 128,470 | Heated 1650, temp. dropped 1300, air-cooled, drawn 1000. |
| L1-L2 | 9.5 | 15.2 | 88,950 | 131,200 | Heated 1550, cooled in air (no draw). |
| L3-L4 | 11.2 | 19.6 | 101,520 | 136,300 | Heated 1550, cooled in air (no draw). |

Averages—Air-Cooled and Drawn 1000 Deg.—on 0.30 Per Cent Carbon Steel

| | | | | | |
|-------|------|------|--------|---------|--|
| R3-R4 | 24.5 | 50.5 | 69,270 | 99,630 | Heated to 1650, temp. dropped to 1300, air-cooled. |
| T3-T4 | 24.5 | 50.3 | 70,050 | 100,950 | Heated to 1550, temp. dropped to 1300, air-cooled. |
| U1-U2 | 22.5 | 51.5 | 67,320 | 99,770 | Air-cooled from 1600. |

Research in the Metal-Working Industry Not Depressed

By MAURICE HOLLAND and WILLIAM SPRARAGEN

Division of Engineering and Industrial Research,
National Research Council

TWENTY-FIVE years ago there were few industrial research laboratories worthy of the name in the United States. Ten years ago the National Research Council was able to compile a list of 500. In 1930 this list grew to over 1600.

Economic pressure and competition have driven many industries into extended research activities as a productive and progressive measure. Nearly three-quarters of a million dollars is spent each working day in the United States to improve manufacturing processes, reduce production costs, develop new products, new fields of ap-

plication and by-products in the nation's industries.

"Science is the basis upon which is reared the civilization of today," says President Hoover. In addition to the scientific output of these laboratories there is an ever-swelling tide of new applications of science coming from the numerous technological institutes and colleges and the university schools of engineering. Some say that science is running away with us. Others cry out the dangers of the "machine age." Well the machines are here and so is science and they are undoubtedly here to stay. We must, therefore,

make the best machines that we can and we must utilize science to its maximum for the good of all.

How has research fared in these lean years? National Research Council has secured data from some 400 companies representing 20 industries. Of the replies received 30 were from the various metal and machinery industries.

Results of Research Survey

The results indicate that for the machinery industry 42.2 per cent (eight of 19) of the companies reporting spent more dollars on research in 1931 than in 1929, 31.6 per cent (six of 19) made no change, and only 26.2 per cent found it necessary to decrease their expenditures. Comparable figures for the various metal industries (steel makers, founders, etc.) are 50 per cent, 20 per cent and 30 per cent respectively.

If we translate these figures in percentage of sales the results are still more startling. Only 7.5 per cent of the corporations reporting from the machinery industry (one of 14) decreased the percentage of their sales income devoted to research; the other 92.5 per cent (13 or 14), as indicated in Table 1, either increased or made no change. None of the various metal companies reduced the percentage of their sales devoted to research.

These figures apply to the large as well as the small companies, although the percentages vary considerably as between the ferrous metal producing and casting industry and the machinery industry.

In this metal industry so-called none of the larger companies decreased their dollar expenditures, whereas two of the medium-size and one of the small companies found it necessary to do so. However, if we take the percentage of sales basis we find that all of the companies, regardless of size, increased or made no change in their research expenditures in this industry in percentage of sales.

In the machinery industry, on the other hand, we find that a third of the

TABLE 1—CHANGE IN RESEARCH EXPENDITURES—MACHINERY INDUSTRY

| Size of Companies as Indicated by Research Expenditures in 1931 | 1931 Compared with 1929 | | | | In Per Cent Sales | | | |
|---|----------------------------|------------|----------------|------------|----------------------------|------------|----------------|------------|
| | In Dollars | | | | In Per Cent Sales | | | |
| | No. of Companies Reporting | In-creased | Made No Change | De-creased | No. of Companies Reporting | In-creased | Made No Change | De-creased |
| Large (spent over \$100,000) | 5 | 3 | 2 | .. | 3 | 2 | 1 | .. |
| Medium (spent from \$10,000 to \$100,000) | 12 | 4 | 4 | 4 | 7 | 6 | .. | 1 |
| Small (spent under \$10,000) | 1 | 1 | .. | .. | .. | .. | .. | .. |
| General (did not report size of expenditure) | 1 | .. | .. | 1 | 4 | 3 | 1 | .. |
| All companies reporting | 19 | 8 | 6 | 5 | 14 | 11 | 2 | 1 |

STEEL MAKERS AND IRON AND STEEL FOUNDERS

| | | | | | | | | |
|--|----|----|----|----|----|----|----|----|
| Large (spent over \$100,000) | 3 | 1 | 2 | .. | 3 | 2 | 1 | .. |
| Medium (spent from \$10,000 to \$100,000) | 4 | 2 | .. | 2 | 4 | 4 | .. | .. |
| Small (spent under \$10,000) | 3 | 2 | .. | 1 | 3 | 3 | .. | .. |
| General (did not report size of expenditure) | .. | .. | .. | .. | .. | .. | .. | .. |
| All companies reporting | 10 | 5 | 2 | 3 | 10 | 9 | 1 | .. |

TABLE 2—RESEARCH EXPENDITURES IN 1931 IN PERCENTAGE OF SALES INCOME—MACHINERY INDUSTRY

| Size of Companies as Indicated by Research Expenditures in 1931 | No. of Companies Reporting | Percentage of Sales Income | | | |
|---|----------------------------|----------------------------|------------------|-----------------|------------------|
| | | Over 10 Per Cent | 5 to 10 Per Cent | 1 to 5 Per Cent | Under 1 Per Cent |
| Large (spent over \$100,000) | 3 | .. | 1 | 2 | .. |
| Medium (spent \$10,000 to \$100,000) | .. | .. | .. | .. | .. |
| Small (spent under \$10,000) | 9 | .. | 1 | 7 | 1 |
| General (did not report size of expenditure) | 4 | 1 | .. | 2 | 1 |
| All companies reporting | 16 | 1 | 2 | 11 | 2 |

STEEL MAKERS AND IRON AND STEEL FOUNDERS

| | | | | | |
|--|----|----|----|----|----|
| Large (spent over \$100,000) | 3 | .. | .. | .. | 3 |
| Medium (spent \$10,000 to \$100,000) | 5 | .. | .. | 2 | 3 |
| Small (spent under \$10,000) | 2 | .. | .. | 2 | .. |
| General (did not report size of expenditure) | .. | .. | .. | .. | .. |
| All companies reporting | 10 | .. | .. | 4 | 6 |

RESEARCH expenditures in the metal-working industry have held up very well during the depression, according to a survey made by the authors. Of 19 machinery makers only five spent less in 1931 than in 1929, whereas a total of 10 steel makers and foundries disclosed only three with reduced expenditures. In terms of percentage of sales only one of the machinery makers showed a decrease in outlay, while none of the hot metal group reported a decline.

A comparison with a similar survey made in 1928 indicates that among machinery makers there has been a shift in the emphasis of research from improved quality to the development of new products and new fields of application. In the metal industry the present major emphasis is on quality improvement.

medium-sized companies found it necessary to decrease the percentage of sales devoted to research as compared with none of the large and smaller size companies. In terms of percentage of sales one of the medium-size companies of the machinery industry found it necessary to decrease its research expenditures, whereas the small and medium-sized companies all increased such expenditures or made no change.

Proportion of Sales Income Devoted to Research

The figures given in Table 2 are significant and vary with the different industries. In the machinery industry we find that only one of the 16 companies devotes over 10 per cent of its sales to research, two devote 5 to 10 per cent, and the great majority devote from 1 to 5 per cent of their sales income to research, leaving two spending under 1 per cent.

Among the metal producers, where the percentage of profit is somewhat smaller, we find that four of 10 are devoting from 1 to 5 per cent of their sales to research and six are spending under 1 per cent.

In the machinery industry we find that the larger companies devote a somewhat greater percentage of their sales to research. In the case of the metal industry, the smaller companies, which usually deal with special products rather than with large tonnage, devote a somewhat greater proportion of their sales to research.

Effectiveness of Research Programs

The effectiveness of research is analyzed in Table 3. We find that more than 90 per cent of the firms responding to our inquiry from the machinery industry (20 of 22) believe that they will be affected by future technical developments to a considerable degree. This compares with 66 per cent (10 of 15) of the metal producing industry. This opinion is shared by the research directors in most of the companies from which we have received data regardless of the size of the company. It is significant to note that a little more than half of the companies reporting from

the machinery industry stated that they have made technical developments useful to other industries as against two-thirds of the companies so reporting for the metal industry.

We find that both, however, have produced and marketed new products during the past two years and that in such activities the small companies utilized their research work as effectively as did the larger companies.

Major Emphasis of Research Programs

We find that the machinery industry follows many of the other industries in that the major emphasis in

1931 was in the development of new products, although a large proportion indicated that their major emphasis was on the improvement of quality of product. The two together accounted for 22 of the 25 reporting companies.

In the metal industry, on the other hand, only three out of 15 reporting devoted their attention to the development of new products, whereas 10 companies devoted the major emphasis of their research program on improvement of quality.

As in other industries there has come about in these industries a gradual change in the emphasis of the research program. In 1928 a survey was made by the Division of Engineering and Industrial Research of the activities of some 800 companies, of which there were a total of 42 companies from the machinery group. At that time nearly all were devoting a considerable portion of their research program to improved quality, 33 per cent devoted considerable attention to the reduction of production costs, and only 7 per cent devoted attention to the development of new products. In the metal field only two out of 12 devoted any considerable attention to the development of new products, although all of them stated that they were seeking ways to reduce production costs.

This demonstrates the flexibility of research as a tool of management to
(Concluded on Advertising Page 12)

TABLE 3—RESULTS OF TECHNICAL DEVELOPMENTS—MACHINERY INDUSTRY

| Size of Companies as Indicated by Research Expenditures in 1931 | Will be Affected by Future Technical Developments | | Have Made Technical Developments Useful to Other Industries | | Have Produced New Products Commercialized During Past Two Years | | Hold That Research Helped Profits or Limited Losses |
|---|---|-------------|---|----|---|----|---|
| | Will Be | Will Not Be | Yes | No | Yes | No | |
| Large (spent over \$100,000)..... | 4 | .. | 2 | 2 | 5 | .. | 4 |
| Medium (spent \$10,000 to \$100,000)..... | 9 | 2 | 6 | 4 | 9 | 2 | 8 |
| Small (spent under \$10,000)..... | 1 | .. | .. | .. | 1 | .. | 1 |
| General (did not report size of expenditure)..... | 6 | .. | 2 | 2 | 6 | .. | 5 |
| All reporting companies..... | 20 | 2 | 10 | 8 | 21 | 2 | 18 |
| STEEL MAKERS AND IRON AND STEEL FOUNDERS | | | | | | | |
| Large (spent over \$100,000)..... | 2 | 1 | 2 | 1 | 2 | .. | 2 |
| Medium (spent \$10,000 to \$100,000)..... | 2 | 4 | 3 | 4 | 6 | 1 | 7 |
| Small (spent under \$10,000)..... | 3 | .. | 3 | .. | 2 | .. | 3 |
| General (did not report size of expenditure)..... | 3 | .. | 2 | .. | 2 | 1 | 2 |
| All reporting companies..... | 10 | 5 | 10 | 5 | 12 | 2 | 14 |

TABLE 4—MAJOR EMPHASIS OF RESEARCH PROGRAMS—MACHINERY INDUSTRY

| Size of Companies as Indicated by Research Expenditures in 1931 | No. of Companies Reporting | Reduction of Production Costs, 1931 | Improvement of Quality, 1931 | New Products, 1931 | New Fields of Application, 1931 |
|---|----------------------------|-------------------------------------|------------------------------|--------------------|---------------------------------|
| Large (spent over \$100,000)..... | 5 | .. | 1 | 3 | 1 |
| Medium (spent \$10,000 to \$100,000)..... | 13 | .. | 6 | 6 | 1 |
| Small (spent under \$10,000)..... | 1 | .. | 1 | .. | .. |
| General (did not report size of expenditure)..... | 6 | 1 | 2 | 3 | .. |
| All reporting companies..... | 25 | 1 | 10 | 12 | 2 |
| STEEL MAKERS AND IRON AND STEEL FOUNDERS | | | | | |
| Large (spent over \$100,000)..... | 3 | .. | 2 | 1 | .. |
| Medium (spent \$10,000 to \$100,000)..... | 7 | .. | 4 | 2 | 1 |
| Small (spent under \$10,000)..... | 3 | 1 | 2 | .. | .. |
| General (did not report size of expenditure)..... | 2 | .. | 2 | .. | .. |
| All reporting companies..... | 15 | 1 | 10 | 3 | 1 |



Improved Materials

THOROUGH precision methods of manufacture, the bolt has entered the equipment industry as the chief means of fastening elements.

REFRACTORY materials are closely interlocked with the metal industry, as it is only after research workers of the refractory manufacturers have perfected new resistant materials that the steel and alloy producers can take full advantage of the developments in their own research departments. During 1932, despite the depression, or perhaps because of the depression, many new refractories were produced. A survey was made by the General Refractories Co., Philadelphia, to establish facts concerning the property of absorbing and giving up heat of various refractory materials. The report of H. P. Heuer, director of research of that company, states that unburned magnesite brick will take up and give out approximately 40 per cent more heat than standard fire clay brick. This is important to the designer of regenerative checkers, especially in connection with open-hearth furnaces.

The use of 50 per cent alumina in the upper courses of stoves was extended during the year and was the means of widespread economy. A quick-setting material composed largely of magnesite with about 20 per cent lime was developed for making repairs to open-hearth furnace bottoms.

The Carborundum Co. introduced a line of porous products made of fused aluminum oxide and intended for industrial use as filters and for the diffusion of compressed air. This company also introduced new shapes

for fire brick and insulated brick and reports an entirely new refractory, developed in the laboratory, which will be placed on the market in the near future.

The Botfield Refractories Co., Philadelphia, introduced a plastic chrome ore refractory for unusually high-temperature metallurgical work. Both the United States Pipe & Foundry Co. and the National Tube Co. developed cement linings for pipe, designed to give interior surfaces which not only are smoother but which resist the action of chemicals and avoid deposits when used for city water supply.

Fuel Oils Improved

Many of the oil companies made good strides during the past year in the improvement of their products. The Pennsylvania Lubricating Co. reports a new line of light-colored, transparent liquid lubricants with unusual adhesive and semi-fluid characteristics. This line is especially designed for use on small gears and bearings in installations calling for a high-temperature resisting lubricant.

Much more attention has been devoted to cooling solutions intended for high-speed machining operation, and manufacturers of special solutions claim they are now ready to take care of any cutting job which may be presented.

Improved refining processes have greatly increased the utility of fuel oil in industry, according to a report

of K. E. DeRosay, fuel oil engineer, Sun Oil Co. This report covers fuel oil consumption and progress during the year and states that ordinarily railroads and manufacturing plants account for one-third of the national consumption of fuel oil. In a normal year the steel industry alone consumes over 20,000,000 bbl. The consumption of fuel oil for Diesel engine use increased in 1932 and there was an increased use of fuel oil to replace gas oil in the manufactured gas industry. "An increasingly greater knowledge of the proper methods of burning liquid fuels," continues the report, "has bettered the efficiency of oil-fired units and has contributed to the conversion of numerous plants from coal to oil burning. The maximum possibilities of fuel oil in industry as yet have not been realized. Fuel oil and gas oil can be used in all industrial and manufacturing processes where the generation of heat and power is involved. With a resumption of industrial activity the consumption of fuel oil by manufacturers will exceed all figures for previous years."

Many New Bearings Appear

Among the new types of bearings developed recently may be mentioned the Morgan Construction Co.'s bearing for steel mills, two types of plastic bearings intended for steel mills—one introduced by the Bakelite Corp., Bound Brook, N. J., and one by the General Electric Co., and a bearing metal for airplane crankshaft use, composed of 70 per cent copper and 30 per cent lead. For this last metal the manufacturers claim less friction, high melting temperature, and longer life than with the usual babbitt metal. The Morgan Construction Co. bearing is the sleeve type and instead of using the roll neck proper as a bearing, uses sleeve journals. It is completely



Steel gears are growing more silent. The and precision

Widen Markets—II

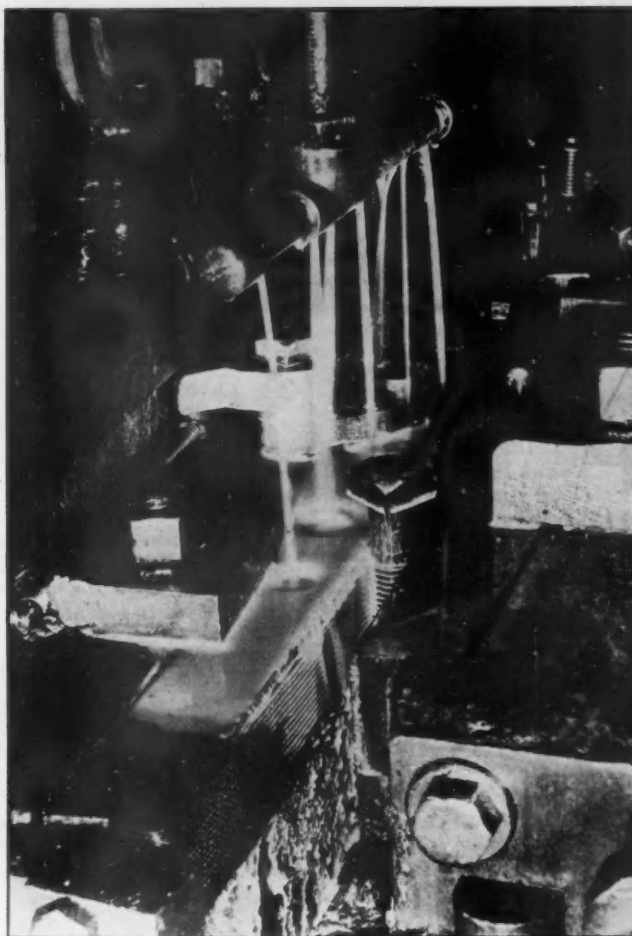
UNDER this same title in the issue of THE IRON AGE, of Jan. 5, the 1932 advance in materials was reviewed under the following division headings: steel, alloys, non-ferrous metals, castings, forgings, die castings and stampings. Many other materials and machinery elements are closely associated with the metal-working industry and this added article is presented to round out the previous review.

enclosed and one set has been in heavy-duty service since last March.

The plastic bearings are said to give ten times the life of previous bearings in certain kinds of service. The R. W. Rhoades Metaline Co., Inc., New York, has given particular attention to an oilless bearing to withstand high temperatures in the steel and heat processing industries. The Skayef Ball Bearing Co., Hartford, Conn., reports progress in its research department, to the end that anti-friction bearings of better quality and design have been produced. According to the report of this company, cutting tools equipped with the new bearings are able to stand up under heavier loads and cuts than was possible where limits of dimension were less close and materials used less suited to the requirements. "We now feel," continues this company's report, "that the burden of production lies with the cutting steel manufacturer rather than with the manufacturer of machine tools."

A new type of fastening called a rivet-bolt has been put in service

NEW cooling solutions developed during 1932 have contributed much toward the successful machining at greatly increased speeds.



recently by the Dardelet Threadlock Corp., New York. This bolt has a ribbed shank slightly larger in diameter than the hole, so that when it is driven home a well-filled hole is insured. In addition to this, the thread is cut with a self-locking principle. Laboratory tests have shown fastenings made with this type of bolt to have the holding power of a rivet with increased strength of joint.

An unusual type of fastening which is still in the more or less spectacular stage is the so-called Temple Gun originally intended for use in attaching lugs or rivets to the sides of sunken steel vessels but recently used in many new fields. The power used for riveting is supplied by gun powder and the rivet is the projectile. Delayed action and the use of a break pin serve to give an initial velocity in the neighborhood of 5000 ft. per second. By this means, steel studs are shot into heavy steel plates, leaving a projecting threaded portion for making attachment. The Bethlehem Steel Co. has brought out studs and nuts in several new alloys during the year. For heavy-duty work at temperatures up to 1100 deg. F. it has introduced a chrome-tungsten steel, and for somewhat lower temperatures it offers a chrome-nickel steel.

Quiet Gears Are Featured

Steel has made considerable progress during the past year in the struggle to establish itself as a suit-

able material for gears in industry. One of the chief objections, that of noise, has been attacked from several angles with considerable success. The Fellows Gear Shaper Co., Springfield, Vt., offers as its contribution a scientific method of lapping. This company states: "One of the noticeable advantages of a lapped surface on a gear, over that of producing a surface by any other method, is that the lapped surface is always quieter, other factors remaining the same. When we understand the action of gear teeth as they pass through mesh, this phenomenon is easily accounted for. Gear teeth only roll on the pitch line. They slip at all points of their action and if the surfaces are not smooth and free from ridges a certain amount of noise is bound to result. Our tests show that even a ground surface on a gear tooth does not produce a quiet operating gear."

The John Waldron Corp., New Brunswick, N. J., has brought out a so-called silent steel gear. This new product is made up of thin steel laminations clamped tightly together to form the gear blank, into which threads are cut in the usual manner. A remarkable reduction in sound quality is shown by hammering first a solid gear blank and then a Waldron laminated gear blank.

In the field of quality, the American Cyanamid & Chemical Corp., New York, reports the use of a new aero-



Important features are laminated construction lapping.

World Production of Iron and Steel Declined Less Than American

By E. F. CONE

PRODUCTION of pig iron and steel in all of the steel-producing countries of the world declined less in 1932, as compared with 1931, than did the output of the United States. The declines in American production were the most severe, with those of Germany also heavy.

At 8,750,000 tons, American pig iron output last year was 53 per cent under that of 1931, while that of the world was only 30 per cent. In steel ingots, the American decline was 48 per cent from 1931, with that of the world 28.5 per cent.

With the cooperation of the National Federation of Iron and Steel Manufacturers, of London, England,

fairly accurate estimates of the pig iron and steel ingot and castings output of the producing countries have been assembled. The data are found in the accompanying tables.

World production of pig iron last year, representing 29 countries, approximated 38,700,000 gross tons with data for the last month or two estimated. This is a decrease of about 30 per cent from the 1931 output of 55,040,000 tons, of 51.5 per cent from that of 1930 and 60.5 per cent from that of 1929. The 1932

total slightly exceeds the 37,680,000 tons made in 1921.

The steel ingot and castings production last year, estimated at 49,100,000 tons for 23 countries, shows a decline of about 28.5 per cent from the 68,560,000 tons made in 1931, of 47.5 per cent from the 1930 total, and of 58.5 per cent from the record output in 1929. It exceeds by about 5,590,000 tons the 1921 total of 43,510,000 tons.

Last year the American pig iron production was only 22 per cent of the world total. In 1931 our proportion was 33.5 per cent and in 1929 it was 44 per cent. In steel the American output last year was 27.5 per cent of the total world production contrasting with nearly 38 per cent in 1931 and with 47.8 per cent in the record year of 1929.

With the exception of Russia, all countries suffered declines last year from 1931 in both pig iron and steel. The position of Russia in substantially increasing output in 1932 is noteworthy.

Steel Mill Engineers Witness Breaker Tests

Spectacular power arcs of 20,000 amp., 6600 volts, 60 cycle were broken recently on a conventional horn gap before a group of 120 steel mill engineers and executives at the Westinghouse laboratories, East Pittsburgh. The tests were made to show the ability of the company's De-ion air circuit breakers to withstand repeated short circuits up to 39,000 amp. with scarcely any outward display or disturbance.

This breaker is designed to replace oil breakers in steel mills. To demonstrate its use for inching service the same breaker interrupted 2000 amp. at 6600 volts at the rate of 10 interruptions a min. for 10 min. Previously it had opened 1000 amp. at 6600 volts continuously at the same rate totaling about 1400 operations and had a mechanical test of 40,000 operations without load. The visitors also inspected De-ion AB breakers and witnessed tests similar to those for the large air break breakers. Prior to the demonstration, an inspection tour was conducted through the plant.

Table of World Production of Pig Iron in Millions of Gross Tons

| Country | 1913 | 1928 | 1929 | 1930 | 1931* | 1932* |
|------------------------------|-------|-------|-------|-------|-------|-------|
| United Kingdom | 10.26 | 6.61 | 7.59 | 6.19 | 3.77 | 3.56 |
| Germany | 10.73 | 11.62 | 13.19 | 9.54 | 5.97 | 3.80 |
| France | 8.93 | 9.82 | 10.20 | 9.88 | 8.07 | 5.45 |
| Belgium | 2.45 | 3.84 | 4.03 | 3.31 | 3.14 | 2.70 |
| Luxemburg | 2.51 | 2.73 | 2.86 | 2.43 | 2.02 | 1.93 |
| Saar | 1.35 | 1.91 | 2.07 | 1.88 | 1.49 | 1.31 |
| Russia | 4.55 | 3.22 | 4.24 | 4.90 | 4.30 | 5.50 |
| Poland | 0.60 | 0.67 | 0.69 | 0.47 | 0.38 | 0.17 |
| Norway | ... | 0.08 | 0.14 | 0.14 | 0.10 | 0.10 |
| Sweden | 0.72 | 0.43 | 0.52 | 0.49 | 0.40 | 0.25 |
| Italy | 0.42 | 0.56 | 0.71 | 0.53 | 0.50 | 0.45 |
| Austria | ... | 0.45 | 0.45 | 0.28 | 0.20 | 0.15 |
| Hungary | 2.31 | 0.30 | 0.28 | 0.25 | 0.20 | 0.15 |
| Czechoslovakia | ... | 1.54 | 1.62 | 1.42 | 1.20 | 0.56 |
| Spain | 0.42 | 0.56 | 0.74 | 0.59 | 0.47 | 0.30 |
| Roumania | ... | ... | 0.10 | 0.10 | 0.10 | 0.07 |
| Holland | ... | ... | 0.25 | 0.27 | 0.26 | 0.28 |
| United States | 30.97 | 38.16 | 42.61 | 31.75 | 18.43 | 8.75 |
| Canada | 1.02 | 1.08 | 1.16 | 0.81 | 0.47 | 0.14 |
| Australia | 0.05 | 0.41 | 0.42 | 0.31 | 0.38 | 0.45 |
| India | 0.21 | 1.05 | 1.35 | 1.18 | 1.07 | 0.90 |
| Japan | 0.24 | 1.50 | 1.55 | 1.64 | 1.53 | 1.21 |
| China and other countries... | 0.16 | 0.40 | 0.46 | 0.84 | 0.59 | 0.52 |
| Total | 77.90 | 86.94 | 97.23 | 79.20 | 55.04 | 38.70 |

*Partly estimated.

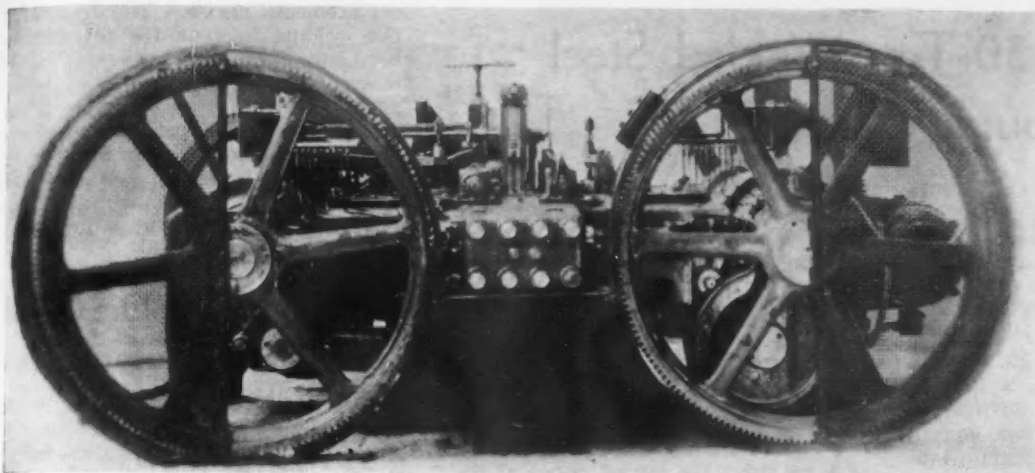
Data revised for some years from those previously published.

Table of World Production of Steel Ingots and Castings in Millions of Gross Tons

| Country | 1913 | 1928 | 1929 | 1930 | 1931* | 1932* |
|------------------------------|-------|--------|--------|-------|-------|-------|
| United Kingdom | 7.66 | 8.52 | 9.64 | 7.33 | 5.20 | 5.22 |
| Germany | 11.99 | 14.29 | 15.99 | 11.36 | 8.16 | 5.55 |
| France | 6.86 | 9.35 | 9.55 | 9.33 | 7.70 | 5.46 |
| Belgium | 2.43 | 3.87 | 4.07 | 3.30 | 3.16 | 2.74 |
| Luxemburg | 1.31 | 2.53 | 2.66 | 2.24 | 2.00 | 1.93 |
| Saar | 2.05 | 2.04 | 2.17 | 1.91 | 1.51 | 1.40 |
| Russia | 4.75 | 4.18 | 4.76 | 5.46 | 5.00 | 5.50 |
| Poland | 1.03 | 1.41 | 1.36 | 1.22 | 1.15 | 0.48 |
| Sweden | 0.58 | 0.57 | 0.68 | 0.60 | 0.50 | 0.53 |
| Spain | 0.30 | 0.78 | 0.97 | 0.86 | 0.59 | 0.49 |
| Austria | ... | 0.63 | 0.62 | 0.47 | 0.46 | 0.35 |
| Hungary | 2.58 | 0.48 | 0.50 | 0.36 | 0.30 | 0.25 |
| Czechoslovakia | ... | 1.71 | 2.11 | 1.81 | 1.50 | 0.75 |
| Italy | 0.92 | 1.93 | 2.11 | 1.75 | 1.43 | 1.36 |
| United States | 31.30 | 51.54 | 56.43 | 40.70 | 25.95 | 13.50 |
| Canada | 1.04 | 1.24 | 1.39 | 1.01 | 0.67 | 0.34 |
| Australia | 0.01 | 0.46 | 0.46 | 0.42 | 0.36 | 0.45 |
| India | 0.06 | 0.41 | 0.58 | 0.62 | 0.63 | 0.55 |
| Japan | 0.24 | 1.84 | 2.05 | 2.29 | 2.00 | 2.00 |
| China and other countries... | 0.04 | 0.20 | 0.33 | 0.33 | 0.29 | 0.25 |
| Total | 75.15 | 107.98 | 118.43 | 93.37 | 68.56 | 49.10 |

*Partly estimated.

Data revised for some years from those previously published.



HEADS or special upsets are produced on both ends of straightened and cut-to-length wire blanks simultaneously. The machine has capacity for wire blanks 7/16 in. in diameter, 3 to 11 in. long, and handles from 60 to 65 blanks per min.

Automatic Machine Cold Heads Both Ends of Wire Blanks Simultaneously

THE illustrations show a special, automatic two-blow open-die cold heading machine built by the E. J. Manville Machine Co., Waterbury, Conn., for producing heads or special upsets on the ends of straightened and cut-to-length wire blanks simultaneously, or extruding both ends of such blanks simultaneously. The machine has capacity for wire blanks 7/16 in. in diameter, 3 to 11 in. long. It handles from 60 to 65 blanks a minute.

Ordinary cold-drawn basic steel wire or high-carbon materials are generally used for the blanks. Although furnished primarily for making automobile wire wheel spokes having a head of the same or similar shape on each end, the machine may also be used for producing various other types of double-end upsets. Best results are obtained when the volume of heading or extruding on each end of the blank is practically the same. However, when the character of the head requires more metal than in the case of the ordinary spoke head, or when there is a variation in the amount of metal to be gathered on both ends, the machine can be changed to meet these requirements.

The machine is simple in operation, is accessibly arranged, and has high operating efficiency. Its principal elements include a feeding device by means of which wire is taken from the coil, straightened, and fed against a stop. A cut-off mechanism severs the wire to exact length, and a mechanical device delivers the wire blank into a feed sector. The latter places the blank under vertical fingers, which, in turn, place it between the heading dies. These dies receive and protect that portion of the blank which is to form the body.

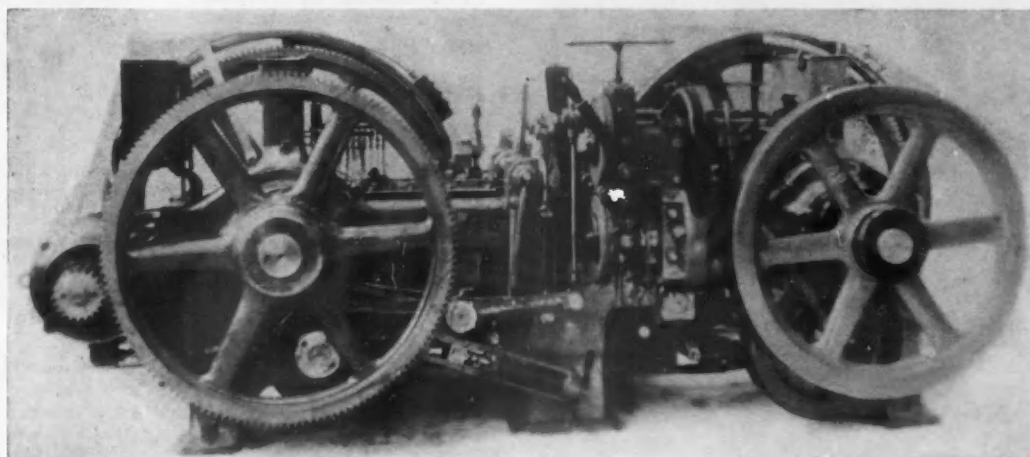
A die-gripping mechanism opens and closes the dies securely during the heading operation. There are two pairs of punches. The first pair advance to the projecting ends of the blank and press them into cone or other preparatory shape. The second pair, or finishing punches, then form the ends into the required shape under great pressure. The finished blank is ejected into a chute, and the process is repeated.

Except for the intermediate feeding mechanism and die pocket, this machine in general construction is the same as the Manville two-blow

open-die header, and an operator familiar with the adjustments and operation of the latter, would have no difficulty in operating this cold header.

The machine may be adapted to many special purposes other than upsetting both ends of a spoke simultaneously. By producing a spherical head on opposite ends of a wire blank in this machine, the blank may be flattened and pierced in a subsequent operation, and thus used as a cold forged connecting link. Similar blanks may be produced, especially when the volume of metal and shape of opposite ends are the same. It also is possible, when producing U-bolts, to feed and cut off a blank of the required length and by single or double extruding with the punches prepare the ends of the blank for roll threading in a separate operation, after which the blank may be U-ed. It is stated that this process not only is much faster than straightening and cutting to length in a wire straightening machine, and then in a separate operation cutting the threads, but it also gives the blank the added strength of roll threading.

Two sizes of the machine, arranged for either belt or direct connected geared motor drive, will be built. The larger size will handle 1/2-in. diameter wire, with approximately the same blank lengths as the machine described above. Its operating speed is 50 to 55 blanks a minute.



FEED side of the double-end double-stroke open-die cold heading machine, without straightener. A wire feed control is provided on each side of the machine to facilitate operation.

Builds 350-Ton Welded Steel Double-Crank Press

THE Allsteel Press Co., 12015 South Peoria Street, Chicago, has brought out a 350-ton capacity Verson straight-side double-crank-press of welded steel construction. The machine has a bed area of 48 x 140 in., a stroke of 10 in., and a shut height of 20 in. It is 154 in. high, overall, occupies floor space of 82 x 190 in., and weighs 100,000 lb. Savings in floor space, foundation costs and in power consumption are attributed to the welded steel design.

The press is double geared, and two balance wheels, one on each side of the high-speed backshaft, are provided. The frame is of four-piece tie rod construction; tie rods are heat treated and are shrunk in place. The crown is of box type, amply ribbed and braced, and the bed is built flush with the floor, no pit being necessary. Uprights are of tubular construction, the plates being bent at the corners and welded centrally. The ram, of double-housing type, is contained within the long ways at all points of the stroke, and is spring counterbalanced. The alloy steel crankshaft is heat treated and ground and gears and pinions are of steel and have cut teeth. The backshafts run in roller bearings. Lubrication is provided by two force feed units located on each side of the press.

The clutch is of multiple-disk friction type and is operated by hand

and foot air trip. The drive is by individual motor and V-belts. The ram is adjusted by means of reversing the motor with push button control. The brake is self-releasing.

Special Bolt for Use In Projection Welding

A SPECIAL bolt having three lugs on either the top or bottom of the head for fastening by resistance welding to sheet metal products is being manufactured by the Ohio Nut & Bolt Co., Berea, Ohio. While projection welding has resulted in the elimination of the use of bolts in some cases, for other work a bolt of suitable design can be used to take advantage of the projection welding process. As the bolts are welded into permanent position, they cannot turn when nuts are being applied. Use of these bolts in the fabrication of sheet metal parts is claimed to result in economies in assembling, and to have advantages where, after parts are assembled, bolt heads are not within reach of a wrench.

These bolts can be welded to sub-assemblies, making final assemblies or



ABOVE

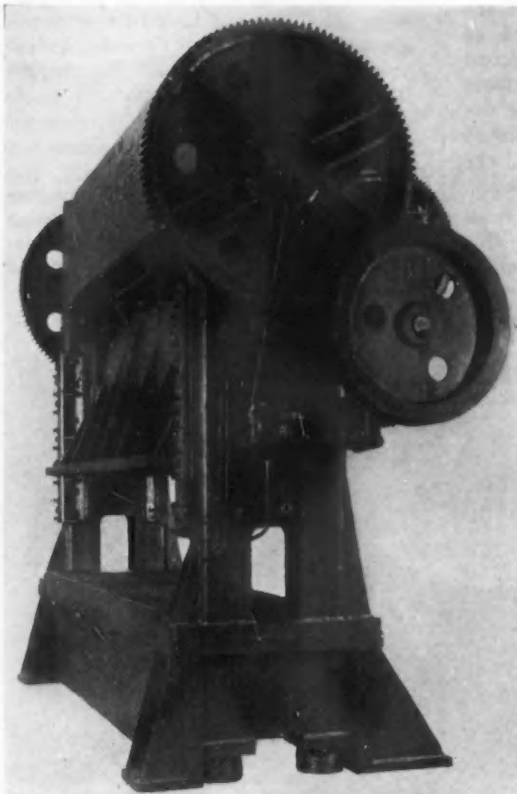
THE lugs permit fastening the bolt to sheet metal parts by resistance welding. They are furnished on either the top or bottom of the head.

AT RIGHT

A NUMBER of advantages, including longer life, are claimed for the circular chasers of this self-opening die head.

AT LEFT

THE bed of this welded all-steel 350-ton capacity double-crank press is built flush with the floor line, and no pit is necessary.



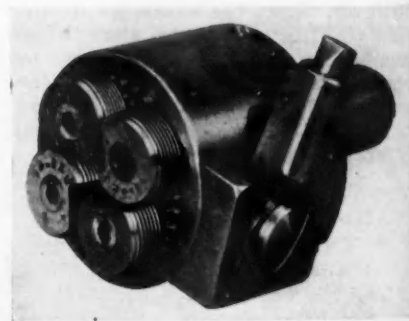
replacements easier. The bolt with the welding lugs on the top of the head leaves one side of the sheet metal clear of obstructions and hence is an advantage when a flush surface is required either for appearance or clearance. In diameters from 3/16 to 1/2 in., these bolts are being used in the manufacture of automobile bodies, refrigerator cases and other products.

Circular Chaser Die Head for B. & S. Automatics

A SELF-OPENING die head, with circular chasers, made to fit Brown & Sharpe automatics, has been introduced by the National Acme Co., Cleveland. This tool is designed principally to give greater chaser life, but use of the circular forming tool principles is also said to enable the operator to secure a better thread profile and finish due to the natural cutting clearances of the circular tool.

These chasers are reset and re-ground according to predetermined micrometer measurements in the tool room on chaser blocks that are used in the die head. This enables the operator to put the chasers and blocks in the die head and start production immediately without adjustment for length, and without disturbing the cutting face location. Adjustment for snug or loose fit can be made in a few moments without removing the die, and the chasers and chaser blocks can be removed or replaced, it is stated, in 30 sec.

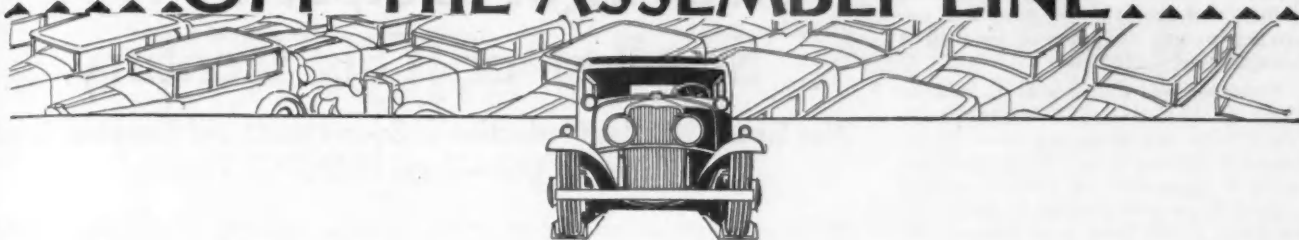
This tool is arranged so that it is automatically closed just before the threading operation in the threading position. Compensation is provided in the shank to prepare against possible variation in tool slide travel due to cam wear. Minimum cutting diameter is 0.056 in. and chasers may be had in either the milled or ground thread.



Ground thread chasers may be furnished to cut as fine as 80 threads per inch. This Namco circular chaser die head is designated as the type DBS.

Porcelain Enamel Institute will sponsor a cooperative exhibit of 50 to 100 porcelain enameled products at the Chicago World's Fair. A miniature enameling plant will feature the display, which will occupy an entire wing of the General Exhibits Building.

OFF THE ASSEMBLY LINE



Automobile Companies Purchase Steel; Continental Offers a Four at \$355

DETROIT, Jan. 9.

WITH the announcement of Continental's new four-cylinder Beacon car, the much-heralded and much-predicted car to sell at \$350-\$400, has finally arrived. The roadster is priced at \$355, the business coupe and two-door sedan at \$380, and the four-door sedan at \$395. Continental is emphasizing that the Beacon has a standard 56-in. tread and a roomy body; however, its wheel-base is only 101½ in., compared with 107 in. for the Plymouth, 110 in. for the new Chevrolet and 112 in. for the forthcoming Ford.

Concurrent with Continental's revelation has come news that the Willys 77, which John N. Willys has groomed as his four-cylinder, low-price contender for honors in 1933, has a base price of \$395, with some models ranging as high as \$475. It has an overall length of 156 in. and is powered by a 48-hp. engine. Thus, the four-cylinder car is far from passing out of the automotive picture, and the industry's retail prices are gradually sinking to still lower levels. Detroit is of the opinion that Continental and Willys are not to be alone in selling cars under \$400. In fact, the show period which started Saturday will not bring out into the open all the entries in the low-price race. Developments now being made under cover by at least two important manufacturers lead to the conclusion that new models of outstanding interest will be shown to the public for the first time in March or April, or perhaps sooner. There also is a strong possibility that these cars may plumb new price depths.

Price Pressure Will Continue

This rapid and irresistible movement toward lower prices is scarcely a happy event for either materials or parts suppliers. It means an ever-tightening pressure on them for more favorable terms and ruinous bidding, which will result in no one making a profit. It further means that the steel people are going to have a hard fight

Ford gives steel releases covering February requirements. Buick, Pontiac, Olds and Chrysler also buy steel.

* * *

Detroit employment index on Dec. 31 stood at 48, as against 44.2 on Dec. 15 and 39.3 on Nov. 30.

* * *

Continental presents a Beacon four at \$355 and John N. Willys a four-cylinder Willys 77 at \$395.

▼ ▼ ▼

on their hands whenever they attempt to put prices back on to a more remunerative basis. On the other hand, the necessity for every part being produced at the lowest possible cost is not without its blessings. Automobile makers are opening their own departments to competition from outside suppliers, who in some cases are being given the first opportunity in years to bid on business. The transaction is devoid of sentiment and the decision is made solely on the basis of cost per unit. If the company's own departments cannot make parts as cheaply as they can be bought outside, the contract goes to a vendor. This has led one company in the medium-price class to award the manufacture of its ring gears to an outsider, while another company is buying many screw machine products which it formerly made in its own plant. This tendency of management to sit back and regard its own manufacturing departments in the same cold light as it does outside suppliers is resulting already in greatly increased efficiency in those departments and likewise in the awarding of a considerable number of new contracts to parts makers.

Ford Places Steel Orders

The past week has not been without significance to the steel trade. The Ford Motor Co. has given releases for sheets and other forms of steel covering its February requirements, this

material to be delivered to the Rouge plant prior to Feb. 1. The Buick Motor Co. bought steel for 3500 cars, while Pontiac and Oldsmobile have purchased relatively small tonnages. Chrysler Corp. has allocated its first quarter contracts for the period from Jan. 15 to April 15, and has released some steel rollings for early delivery. Chevrolet continues to specify steel at a fair rate for its various plants.

A leading steel consumer apparently is going ahead with its plan for using sheets of less than full finished grade for body purposes. Although its experiment is being watched with interest by the industry, no other maker is contemplating following its lead. However, the fact is conceded that if its program works out as hoped for, the savings will be so substantial that competitors may be compelled to take like action. The quality car companies already are privately bewailing the ultimate effect of this program, which will bring reduced production of full-finished sheets and therefore higher prices to them, since their limited manufacture as well as the quality of their product preclude a change in materials on their part.

The Continental four-cylinder Beacon has a bore of 3½ in. and a stroke of 4 in., giving a piston displacement of 143.1 cu. in. Frame side members are of paneled design; axle shafts are of molybdenum steel with an elastic limit exceeding 170,000 lb. The body is of all-steel construction with sills of the pressed girder type to provide added stiffness. A steel underbody with a ribbed seat pan is a factor of strength and prevents drumming. Roofs are of the French type, with steel side rails. Transmissions have helical cut gears with spiral spline shafts, the spirals being cut to the pitch of the helical gears, thus producing with sliding gears a silent operating transmission. Fenders are deep drawn to conceal the chassis, with "spats" both front and rear. Other features are transverse front spring, double cantilever rear springs, one

U-type spring shackle for the entire chassis, needle bearing universal joints, and 15 to 30 per cent less unsprung weight than in most cars. The sedan weighs 2160 lb.

Oldsmobile is offering a six and an eight at \$745 and \$845 respectively. They have the sweeping lines of all General Motors cars. Front fenders mark a departure in design, having a deep draw and coming down to the running board level only about 6 in. forward of the board. That is, the fender line continues on practically a horizontal line back to where it connects with the running board. The radiator grill is composed of slender chromium bars arranged in herring-bone fashion and is V-shaped with a slight forward curve at the base. The radiator shell is Ducoed to match the body color and has a fine chromium molding outlining its inner edge. A new type of connecting rod bearings is a feature of the Oldsmobile. These have a thin babbitt wall carefully bonded to a thin outer shell of steel or bronze and have a high capacity to withstand heavy pressure loads due to the thinness of the babbitt.

Cylinder blocks of the new Pierce-Arrow twelves are cast from a chromium alloy electric furnace iron having high density and fine grain and capable of being machined to a smoother surface than the iron formerly employed. . . . Great Lakes Steel Corp. continues to operate five of its six open-hearth furnaces. . . . Pistons in the Cadillac V-eight are of molybdenum cast iron electro-plated. . . . The new Auburn eight has a redesigned radiator shell carrying a grid of rustless steel outlined with a chromium plated trim molding. . . . Graham has departed from the conventional line front bumper two distinct chromium bumper plates separated in the center, sloping downward from near the front edges of the fenders to a point well below the lowermost curved forward sweep of the radiator grill. . . . The 1933 Hupmobile is fitted with a side-sway eliminator consisting of a spring steel bar 1 in. in diameter, which operates to resist angular motion between the rear axle and the frame. It is mounted across the frame at a rear cross member in two rubber bushings and is fitted with an arm at each extremity.

Fabricated Structural Steel Off in November

Washington, Jan. 10. — Computed bookings of fabricated structural steel last November totaled 51,600 tons, or 12.9 per cent of capacity, against 74,400 tons, or 18.6 per cent of capacity, in October, according to reports received by the Bureau of the Census from fabricators. Estimated orders for the first 11 months of 1932 aggregated 802,400 tons, or 18.2 per cent of capacity, compared with 1,783,200 tons, or 40.5 per cent of capacity, in the corresponding period of 1931.

Steel Ingot Output in 1932 Smallest of This Century

Not Since 1900 Has Production of Open-Hearth and Bessemer Steel Fallen So Low—Total 13,095,727 Tons

FINAL figures for 1932 on production of open-hearth and Bessemer steel ingots compiled by the American Iron and Steel Institute show a total of 13,095,727 gross tons, the smallest since 1900, in which the output of steel by these two processes was 10,082,905 tons. The 1901 output was 13,369,611 tons and that of 1902 was 14,826,092 tons.

With the addition of 100,000 tons or more of electric and crucible steel ingots and about 200,000 tons of steel castings, the 1932 production of ingots and castings was about 13,400,000 tons.

Excepting July and August, December was the lowest month of the year, the daily rate last month having been 32,485 tons against 31,701 tons in July and 30,830 tons in August. Computed output of open-hearth and Bessemer ingots for the entire month of December was 844,618 tons against 792,533 tons in July and 832,402 tons in August. On a percentage basis, December rated 15.02 against 14.66 in July and 14.26 in August. These percentage figures are based on the institute's estimate of 67,473,630 gross

tons of capacity in open-hearth and Bessemer steel.

The 1932 output was barely more than half of the 1931 total of 25,192,715 tons. The percentage rate last year was 19.41 against 38.13 for 1931.

Canadian Steel Output Up Sharply in November

Canadian production of steel ingots and castings in November, at 37,088 tons, reached the highest level since last April and compares with 28,337 tons in November, 1931. Pig iron output also rose sharply in November to 14,149 tons from 6731 tons in October and barely failed to equal production for November of the preceding year. Production of ferroalloys in November showed little change from that in October.

November production figures and comparisons follow:

| | Nov., 1932 | Oct., 1932 | Nov., 1931 |
|--|------------|------------|------------|
| Pig Iron..... | 14,149 | 6,731 | 14,292 |
| Steel ingots and direct steel castings | 37,088 | 17,102 | 28,337 |
| Ferroalloys | 1,544 | 1,599 | |

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS (Gross Tons)

| Reported by Companies Which Made 95.33 Per Cent of 1931 Ingots | | | | | | |
|--|-------------|-----------|------------------------------------|---------|--------------------------|-----------------------|
| 1931 | Open-Hearth | Bessemer | Calculated Output All Companies | | No. of Work- ing Days | Per Cent Operation |
| | | | Monthly | Daily | | |
| January | 2,098,175 | 296,620 | 2,512,140 | 93,042 | 27 | 43.80 |
| February | 2,131,079 | 296,974 | 2,547,027 | 106,126 | 24 | 49.96 |
| March | 2,565,531 | 346,137 | 3,054,339 | 117,475 | 26 | 55.30 |
| April | 2,321,043 | 316,668 | 2,766,959 | 106,421 | 26 | 50.09 |
| May | 2,130,805 | 301,639 | 2,551,633 | 98,140 | 26 | 46.20 |
| June | 1,782,007 | 246,365 | 2,127,762 | 81,837 | 26 | 38.52 |
| Six Months..... | 13,028,640 | 1,804,403 | 15,559,860 | 100,386 | 155 | 47.25 |
| July | 1,574,379 | 225,030 | 1,887,580 | 72,599 | 26 | 34.17 |
| August | 1,462,254 | 174,380 | 1,716,829 | 66,032 | 26 | 31.08 |
| September | 1,274,072 | 199,151 | 1,545,411 | 59,439 | 26 | 27.98 |
| October | 1,319,958 | 195,943 | 1,590,180 | 58,896 | 27 | 27.72 |
| November | 1,276,856 | 240,441 | 1,591,644 | 63,666 | 25 | 29.97 |
| December | 1,068,384 | 172,046 | 1,301,211 | 50,047 | 26 | 23.56 |
| Total | 21,004,543 | 3,011,394 | 25,192,715 | 81,006 | 311 | 38.13 |

These figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1930, of 66,069,570 gross tons for Bessemer and open-hearth steel ingots.

| Reported for 1932 by Companies Which Made 95.33 Per Cent of 1931 Ingots | | | | | | |
|---|-------------|-----------|------------------------------------|---------|--------------------------------|--------------------------|
| 1932 | Open-Hearth | Bessemer | Calculated Output All Companies | | No. of Work- ing Days | Per Cent Operation |
| | | | Monthly | Daily | | |
| January | 1,230,661 | 160,633 | 1,459,450* | 56,133* | 26 | 25.96* |
| February | 1,232,568 | 157,067 | 1,457,710* | 58,308* | 25 | 26.96* |
| March | 1,149,307 | 193,944 | 1,409,054* | 52,187* | 27 | 24.13* |
| April | 1,086,227 | 144,197 | 1,238,250* | 47,625* | 26 | 22.02* |
| May | 950,785 | 103,593 | 1,106,030* | 42,540* | 26 | 19.67* |
| June | 755,123 | 100,249 | 897,275 | 34,511 | 26 | 15.96 |
| July | 652,650 | 102,872 | 792,533 | 31,701 | 25 | 14.66 |
| August | 696,206* | 97,323* | 832,402 | 30,830 | 27 | 14.26 |
| September | 804,556 | 124,970 | 975,061 | 37,502 | 26 | 17.34 |
| October | 885,773 | 132,876 | 1,068,550 | 41,098 | 26 | 19.00 |
| November | 838,559 | 128,844 | 1,014,794 | 39,031 | 26 | 18.05 |
| December | 722,522 | 82,652 | 844,618 | 32,485 | 26 | 15.02 |
| Total | 10,954,937 | 1,529,220 | 13,095,727 | 41,973 | 312 | 19.41 |

*Revised.

These figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1931, of 67,473,630 gross tons for Bessemer and open-hearth steel ingots.

• • EDITORIAL COMMENT • •

Salutamus THIS week we salute the automobile industry, steel's best customer, which is staging its annual show in New York. Surveying the displays, one is unable to distinguish today's spectacle in sales effort, glorified product and enthusiasm from that of yesterday, when everyone had in his pocket the price of a down payment on a car.

And therein lies the answer to why the motor car world has refused to be stampeded in these challenging times. Instead of bewailing fate, as others have done, it has set its house in order. While others discussed the best thing to do, automobile executives went ahead and did it. Particularly was there no moratorium in sales departments, which redoubled their activities.

It is not surprising, therefore, that Detroit is the busiest industrial center in the country, and promises to continue so for some time. Automobile manufacturers are expecting an increase of 18.9 per cent in shipments of cars, trucks and parts in the first quarter of 1933, compared with the same period of last year, according to reports to the American Railway Association. And for every car produced, approximately 50 man-hours of labor in the steel industry is required.

So again we salute the automobile industry and wish it success in 1933. May its most optimistic hopes be justified. May its courageous expenditure of millions of dollars in preparing new products and its movement forward with firm steps at this time transmit new energy and faith to the hearts of those who are faltering. The spirit of pioneering youth still has hold of it, though it already has attained maturity. May it always retain that spirit.

AFTER being surfeited for months with goods for which low price was almost the sole selling argument and having the phrase "greatest bargain in years" flaunted at us day after day from newspaper pages, we welcome the National Quality Movement of the National Retail Dry Goods Association. This has for its goal "to keep America quality-conscious," and we advocate its extension to industrial as well as consumer goods.

In the process whereby commodity prices were being deflated it was natural that low prices should be emphasized as a welcome relief from the high ones which everyone had been paying. However, there is an irreducible minimum below which products cannot be made without sacrificing quality, and people have learned that even today they cannot buy articles of good workmanship and good materials for nothing. It is this awakening to realities that has provided a groundwork for the quiet, but effective reemphasis on quality as opposed to price.

One observer asks, "Is it economy for the public to pay little and get little? After all, the price of any mer-

chandise means nothing except in relation to what that price buys. Hence, the concerted move now on foot to accelerate the swing to goods built up to a standard instead of down to a price." That consumers of steel and other metal goods are appreciative of the soundness of this view is shown by the fact that they are giving less heed to price alone as an inducement for deserting their regular, responsible sources of supply. Proved quality also must be an ingredient to obtain consideration.

A "Purchasing Power" Vagary

THE proverbial crimes done in the name of religion and of liberty have their match in the economic folly committed in these days in the name of "purchasing power." There was, for example, a New England Congressman who took issue last year with a manufacturer constituent when the latter urged the necessity for reducing all Government salaries. "Think of what that would do to the buying power of the thousands of Government employees," said this Congressman. "Just now I'm expecting to buy a new automobile; but I can't do that if my salary's cut. And so it would be all along the line. Nothing is so much needed at this time to increase the volume of the country's business, and here you propose to cut it down still further."

In the Presidential campaign, Mr. Roosevelt reiterated the call of his party's platform for a reduction of 25 per cent in Federal Government expenses, which would mean roundly a billion-dollar saving. Mr. Hoover favored cutting the budget \$600,000,000, which is just the amount Representative McDuffie, chairman of the Special Economy Committee of the House, has said must be saved. Yet now that the job of actually reducing Government expenditures is being faced at Washington there are raised in some influential quarters the same old objections, due to the same sort of pressure upon Congressmen that has sent two bonus bills on their way to a Presidential veto.

Business men throughout the country who enlisted last year for the war on high cost of government will find no warrant for relaxing vigilance and effort in 1933. When Congressional voices are raised, as again in the past week, for further bond issues, on the ground, forsooth, that in the midst of a war on depression the need of balancing the budget should not be overstressed, it is no time for business to regard campaign promises as self-enforcing.

What can be expected of the Congressional mind in which any concern for the strained tax-paying power of millions of hard-pressed Americans is lost in emotion over the purchasing power of some thousands of office-holding non-producers?

PERSONALS



DAVID AYR

DAVID AYR, who as announced in these columns on Dec. 29 has been made president of the Hendey Machine Co., Torrington, Conn., has had a wide experience in the manufacture of machine tools and other products. He received his early training at the Brown & Sharpe Mfg. Co. Later he was connected with the Pierce Arrow Motor Car Co., Buffalo, after which he became general superintendent of the Gurney Ball Bearing Co., Jamestown, N. Y. During the World War, Mr. Ayr was active in the manufacture of munitions at the Russell Motor Car Co., Buffalo, of which he was works manager. Later he joined the Pratt & Whitney Co., with which he was associated for a number of years, first as works manager and then as manager of the machinery division and a member of the board of directors.

CHARLES F. SPICER, for many years Eastern and Southern representative for the Moore Corp., Joliet, Ill., has been elected vice-president of that company and will also serve as sales counselor. The Moore Corp. celebrated its seventy-fifth anniversary during the past year and has been in control of the same family continuously. LEWIS MOORE, SR., is president, and LEWIS MOORE, JR., vice-president.

WILLIAM G. NICHOL, formerly manager of the Milwaukee office of Neff, Kohlbusch & Bissell, has opened an office at 606 West Wisconsin Avenue, Milwaukee, where he will handle several lines of machine tools, cutting tools and special machinery.

NELSON E. CHANCE, heretofore district manager of the Houston office of the Brown Instrument Co., Philadel-

phia, has been advanced to the position of assistant sales manager, with headquarters at Philadelphia.

ELMER E. GILBERT, sales manager of the turbine department of the General Electric Co., Schenectady, retired on Jan. 1 after an association of 43½ years with the company and its predecessor, the Thomson-Houston Electric Co. The turbine sales department has been made a division of the central station department under the managership of R. B. BEALE, former assistant manager of the turbine sales department.

HENRY S. DEMAREST has been elected president of Greene, Tweed & Co., New York, makers of small tools. JAMES A. MCKEON has been elected vice-president and HERBERT A. ERWOOD, secretary. WILLARD R. PLATT, former president, and HAROLD B. PLATT, vice-president, have resigned.

I. M. SMITH has been made advertising manager of the Central Iron & Steel Co., Harrisburg, Pa., succeeding G. P. BLACKISTON, formerly manager of publicity and advertising.

A. N. VOGT has been appointed special sales representative in the hot rolled bar division of the Youngstown Sheet & Tube Co., Youngstown. He has been identified for 14 years with the Central Alloy Steel Co., Massillon, Ohio, and Associated Alloy Steel Co., Inc., Cleveland.

F. J. MARMION has been appointed manager of sales at Pittsburgh for the American Steel & Wire Co., succeeding the late E. A. NIVEN. On Oct. 1 Mr. Marmion was appointed sales manager at Birmingham, after having been for three years assistant sales manager. He has been with the American Steel & Wire Co. for more

than 25 years. No successor has yet been appointed to fill the vacancy at Birmingham.

KENNETH B. LEWIS, for about 23 years identified with the Morgan Construction Co., Worcester, Mass., has established himself in consulting practice, with offices at 17 East Forty-second Street, New York, and 43 Midland Street, Worcester. In view of the fact that he planned the wire mill of the Sheffield Steel Corp., at Kansas City, with its several innovations in wire mill design and practice, and has been prominently associated with applications of continuous wire drawing, it is to be expected that he will devote himself particularly to wire mill problems.

WILLIAM G. A. MILLAR, purchasing agent for the American Bridge Co., Pittsburgh, retired as of Jan. 1, and has been succeeded by DANIEL HAMMERSCHMIDT who has been assistant purchasing agent.

WILLIAM B. TRAINER has been elected president of the Speck-Marshall Co., Pittsburgh, dealer in mill supplies. CLIFFORD C. TAYLOR has been made secretary and treasurer of the company.

NORTON T. JONES has resigned as president and general manager of the Superior Screw & Bolt Mfg. Co., Cleveland, of which he was the founder. Negotiations for the sale of the company's plant are in progress.

H. A. BRASSERT, president of H. A. Brassert & Co., consulting engineers, Chicago, has returned from Europe where he closed a contract with Stewarts & Lloyds for the construction of a steel plant at Corby, on the iron ore deposits of Northamptonshire.

RENE VON SCHLEINITZ, of the Harnischfeger Corp., Milwaukee, sailed on Jan. 6 from New York on a combined business and pleasure trip to Europe.



F. F. MARQUARD

Frank F. Marquard and Robert J. Tully, new general superintendent and assistant general superintendent respectively of the Clairton, Pa., steel works and by-product coke plant of the Carnegie Steel Co., whose promotion was announced in these columns last week.



R. J. TULLY

SUMMARY OF THE WEEK'S BUSINESS

Steel Business and Prospects Show Signs of Improvement

Ingot Production Rate, at 15 Per Cent, Is Two Points Above December Low—Sheet Prices Decline—Melting Scrap Higher at Pittsburgh

THE volume of steel business has gained moderately, while ingot production, at an average of 15 per cent for the industry, has made the second consecutive weekly gain, and now stands at two points above the year-end low of 13 per cent in the holiday week. Steel output advanced at about a corresponding rate in the early part of January, 1932, though the operation at this time last year was 25 per cent of capacity.

Steel consumers are still very cautious, even in the matter of modest replenishment of depleted inventories, but there has been enough new business from the automobile industry, the can manufacturers and builders of refrigerators to give some of the steel companies slightly better schedules than they had in the latter part of December. The influence of orders for automobile steels and tin plate is apparent in the widely divergent activities of various steel producing districts.

At Cleveland, where sheets, bars and wire for the automobile trade are major products, ingot output is at 35 per cent, while at Wheeling, where tin plate is an important factor in rolling capacity, a gain to the same percentage rate has occurred this week. Pittsburgh production has risen to 14 per cent, while the average for the Valley district has made a gain to 16 per cent. In contrast, the Chicago district, which depends to a considerable extent on construction work and the railroads, has not been able to get above its late December low of 9 per cent, while in eastern Pennsylvania, where structural shapes and plates are outstanding products, steel output is barely above 10 per cent. A week's shutdown of the Steel Corporation's Fairfield works in Alabama has dropped that district's rate below 10 per cent.

THE absence of important buying by the railroads is a distinctly discouraging aspect of the current steel situation, as rollings of rails and car material are usually strong supporting factors at this time of the year. The steel industry believes, however, that the carriers cannot much longer refrain from making purchases for ordinary maintenance work, a recent spurt in releases of track supplies at Chicago lending support to this expectation. Two Van Sweringen roads and a Southern railway may come into the market shortly for rails and the Board of Transportation of New York is taking bids this week on 6000 tons.

The Reading may repair about 3000 cars in addition to a similar number that are now in this road's own shops.

Construction work is at a seasonal ebb, but releases against contracts placed some time ago are being received by the mills, and rollings will be increased the latter part of this month. The Reconstruction Finance Corporation has now advanced a total of \$17,753,000 for self-liquidating projects for which loans have been approved, and the release of these funds will hasten the placing of orders for some needed materials. Other loans of considerable amount are under negotiation. The week's fabricated structural steel lettings were only 5700 tons, not including 1500 tons of plates for river barges, and fresh inquiries call for only 4300 tons.

While the outlook for the automobile industry must remain uncertain pending the results of the January exhibitions, the schedules that were planned for this month are being carried out. After cars for dealers' stocks have been shipped, automobile manufacturing will be synchronized with sales to car users. The caution of the motor car companies is indicated by the fact that some parts makers are slowing down production schedules, and a reduction in assemblies of cars will be put into effect by some units of the industry during the latter part of the month.

In reviewing the complete figures on 1932 ingot output, the steel industry finds solace in the thought that a large reservoir of demands has been built up that ultimately must be satisfied. Last year's total of open-hearth and Bessemer ingots was only 13,095,727 gross tons, the smallest since 1900 for steel made by these processes and barely more than half of the 1931 production. Moreover, no year since 1904 except 1908 even approached the past year's poor record.

THE most disturbing factor in the market is price weakness in sheets, plates and structural shapes. Some grades of sheets are \$2 a ton lower, bringing THE IRON AGE finished steel composite price down to 1.936c. a lb., or only slightly above its 1932 low. On the other hand, heavy melting steel scrap is higher at Pittsburgh, and our scrap composite has advanced to \$6.83 a ton from \$6.75 last week. Pig iron is unchanged at \$13.56 a ton.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:

| | Jan. 10, 1933 | Jan. 3, 1933 | Dec. 13, 1932 | Jan. 12, 1932 |
|---|------------------|-----------------|------------------|------------------|
| No. 2 fdy., Philadelphia..... | \$13.34 | \$13.34 | \$13.34 | \$15.64 |
| No. 2, Valley furnace..... | 14.50 | 14.50 | 14.50 | 15.50 |
| No. 2 Southern, Cin'ti..... | 13.82 | 13.82 | 13.82 | 14.82 |
| No. 2, Birmingham..... | 11.00 | 11.00 | 11.00 | 12.00 |
| No. 2 foundry, Chicago*..... | 15.50 | 15.50 | 15.50 | 16.50 |
| Basic, del'd eastern Pa..... | 13.50 | 13.50 | 13.50 | 16.25 |
| Basic, Valley furnace..... | 13.50 | 13.50 | 13.50 | 15.00 |
| Valley Bessemer, del'd P'gh. | 16.89 | 16.89 | 16.89 | 17.89 |
| Malleable, Chicago*..... | 15.50 | 15.50 | 15.50 | 16.50 |
| Malleable, Valley..... | 14.50 | 14.50 | 14.50 | 16.00 |
| L. S. charcoal, Chicago..... | 23.17 | 23.17 | 23.17 | 23.17 |
| Ferromanganese, seab'd car- lots | 68.00 | 68.00 | 68.00 | 75.00 |

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Rails, Billets, etc.

Per Gross Ton:

| | Jan. 10, 1933 | Jan. 3, 1933 | Dec. 13, 1932 | Jan. 12, 1932 |
|----------------------------------|------------------|-----------------|------------------|------------------|
| Rails, heavy, at mill..... | \$40.00 | \$40.00 | \$40.00 | \$43.00 |
| Light rails at mill..... | 30.00 | 30.00 | 30.00 | 34.00 |
| Rerolling billets, Pittsburgh.. | 26.00 | 26.00 | 26.00 | 28.00 |
| Sheet bars, Pittsburgh..... | 26.00 | 26.00 | 26.00 | 28.00 |
| Slabs, Pittsburgh..... | 26.00 | 26.00 | 26.00 | 28.00 |
| Forging billets, Pittsburgh.... | 31.00 | 31.00 | 31.00 | 34.00 |
| Wire rods, Pittsburgh..... | 37.00 | 37.00 | 37.00 | 37.00 |
| Skelp, grvd. steel, P'gh, lb.... | 1.60 | 1.60 | 1.60 | 1.50 |

Finished Steel

Per Lb. to Large Buyers:

| | Cents | Cents | Cents | Cents |
|--------------------------------|---------|---------|---------|---------|
| Bars, Pittsburgh..... | 1.60 | 1.60 | 1.60 | 1.50 |
| Bars, Chicago..... | 1.70 | 1.70 | 1.70 | 1.70 |
| Bars, Cleveland..... | 1.65 | 1.65 | 1.65 | 1.55 |
| Bars, New York..... | 1.95 | 1.95 | 1.95 | 1.85 |
| Tank plates, Pittsburgh..... | 1.60 | 1.60 | 1.60 | 1.50 |
| Tank plates, Chicago..... | 1.70 | 1.70 | 1.70 | 1.70 |
| Tank plates, New York..... | 1.898 | 1.898 | 1.898 | 1.798 |
| Structural shapes, Pittsburgh | 1.60 | 1.60 | 1.60 | 1.50 |
| Structural shapes, Chicago.. | 1.70 | 1.70 | 1.70 | 1.70 |
| Structural shapes, New York | 1.86775 | 1.86775 | 1.86775 | 1.76775 |
| Cold-finished bars, Pittsburgh | 1.70 | 1.70 | 1.70 | 2.00 |
| Hot-rolled strips, Pittsburgh | 1.45 | 1.45 | 1.45 | 1.40 |
| Cold-rolled strips, Pittsburgh | 1.90 | 1.90 | 2.00 | 1.95 |

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel

Per Lb. to Large Buyers:

| | Jan. 10, 1933 | Jan. 3, 1933 | Dec. 13, 1932 | Jan. 12, 1932 |
|--|------------------|-----------------|------------------|------------------|
| Hot-rolled annealed sheets, No. 24, Pittsburgh..... | 2.00 | 2.10 | 2.10 | 2.25 |
| Hot-rolled annealed sheets, No. 24, Chicago dist. mill... | 2.10 | 2.20 | 2.20 | 2.40 |
| Sheets, galv., No. 24, P'gh.... | 2.75 | 2.85 | 2.85 | 2.80 |
| Sheets, galv., No. 24, Chicago dist. mill..... | 2.85 | 2.95 | 2.95 | 2.90 |
| Hot-rolled sheets, No. 10, P'gh | 1.45 | 1.55 | 1.55 | 1.60 |
| Hot-rolled sheets, No. 10, Chi- cago dist. mill..... | 1.55 | 1.65 | 1.65 | 1.75 |
| Wire nails, Pittsburgh..... | 1.95 | 1.95 | 1.95 | 1.95 |
| Wire nails, Chicago dist. mill | 2.00 | 2.00 | 2.00 | 2.00 |
| Plain wire, Pittsburgh..... | 2.20 | 2.20 | 2.20 | 2.20 |
| Plain wire, Chicago dist. mill. | 2.25 | 2.25 | 2.25 | 2.25 |
| Barbed wire, galv., Pittsburgh | 2.60 | 2.60 | 2.60 | 2.60 |
| Barbed wire, galv., Chicago dist. mill..... | 2.65 | 2.65 | 2.65 | 2.65 |
| Tin plate, 100 lb. box, P'gh.. | \$4.25 | \$4.25 | \$4.25 | \$4.75 |

Old Material

Per Gross Ton:

| | Jan. 10, 1933 | Jan. 3, 1933 | Dec. 13, 1932 | Jan. 12, 1932 |
|---------------------------------|------------------|-----------------|------------------|------------------|
| Heavy melting steel, P'gh.... | \$8.50 | \$8.25 | \$8.75 | \$10.25 |
| Heavy melting steel, Phila.. | 6.75 | 6.75 | 6.75 | 7.50 |
| Heavy melting steel,*Ch'go... | 5.25 | 5.25 | 5.25 | 7.75 |
| Carwheels, Chicago..... | 7.75 | 7.00 | 7.00 | 8.50 |
| Carwheels, Philadelphia..... | 8.00 | 8.00 | 8.50 | 11.50 |
| No. 1 cast, Pittsburgh..... | 9.00 | 9.50 | 9.50 | 10.00 |
| No. 1 cast, Philadelphia..... | 8.00 | 8.00 | 8.00 | 10.00 |
| No. 1 cast, Ch'go (net ton)... | 6.25 | 6.25 | 6.25 | 7.50 |
| No. 1 RR. wrot., Phila..... | 7.50 | 7.50 | 7.50 | 9.50 |
| No. 1 RR. wrot., Ch'go (net)... | 4.50 | 4.00 | 4.00 | 6.50 |

Coke, Connellsville

Per Net Ton at Oven:

| | Jan. 10, 1933 | Jan. 3, 1933 | Dec. 13, 1932 | Jan. 12, 1932 |
|---------------------------|------------------|-----------------|------------------|------------------|
| Furnace coke, prompt..... | \$1.75 | \$1.75 | \$1.75 | \$2.25 |
| Foundry coke, prompt..... | 2.50 | 2.50 | 2.75 | 3.50 |

Metals

Per Lb. to Large Buyers:

| | Cents | Cents | Cents | Cents |
|---------------------------------|-------|-------|-------|-------|
| Lake copper, New York..... | 5.00 | 5.00 | 5.00 | 7.62½ |
| Electrolytic copper, refinery.. | 4.75 | 4.75 | 4.75 | 7.25 |
| Tin (Straits), New York..... | 22.60 | 22.50 | 22.55 | 22.00 |
| Zinc, East St. Louis..... | 3.10 | 3.12½ | 3.12½ | 3.05 |
| Zinc, New York..... | 3.47 | 3.49½ | 3.49½ | 3.42 |
| Lead, St. Louis..... | 2.87½ | 2.87½ | 2.87½ | 3.55 |
| Lead, New York..... | 3.00 | 3.00 | 3.00 | 3.75 |
| Antimony (Asiatic), N. Y.... | 5.45 | 5.40 | 5.40 | 6.00 |

▲▲▲ The Iron Age Composite Prices ▲▲▲

Finished Steel

Jan. 10, 1933
One week ago
One month ago
One year ago

1.936c. a Lb.
1.948c.
1.948c.
1.939c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot rolled strip. These products make 85 per cent of the United States output.

| | High | Low |
|------------|-------------------|------------------|
| 1922 | 1.977c., Oct. 4; | 1.926c., Feb. 2 |
| 1931 | 2.037c., Jan. 13; | 1.945c., Dec. 29 |
| 1930 | 2.273c., Jan. 7; | 2.018c., Dec. 9 |
| 1929 | 2.317c., April 2; | 2.273c., Oct. 29 |
| 1928 | 2.286c., Dec. 11; | 2.217c., July 17 |
| 1927 | 2.402c., Jan. 4; | 2.212c., Nov. 1 |

Pig Iron

\$13.56 a Gross Ton
13.56
13.56
14.64

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

| | High | Low |
|------------|------------------|-----------------|
| 1922 | \$14.81, Jan. 5; | \$13.56, Dec. 6 |
| 1931 | 15.90, Jan. 6; | 14.79, Dec. 15 |
| 1930 | 18.21, Jan. 7; | 15.90, Dec. 16 |
| 1929 | 18.71, May 14; | 18.21, Dec. 17 |
| 1928 | 18.59, Nov. 27; | 17.04, July 24 |
| 1927 | 19.71, Jan. 4; | 17.54, Nov. 1 |

Steel Scrap

\$6.83 a Gross Ton
6.75
6.92
8.50

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

| | High | Low |
|------------|------------------|----------------|
| 1922 | \$8.50, Jan. 12; | \$6.42, July 5 |
| 1931 | 11.33, Jan. 6; | 8.50, Dec. 29 |
| 1930 | 15.00, Feb. 18; | 11.25, Dec. 9 |
| 1929 | 17.58, Jan. 29; | 14.08, Dec. 2 |
| 1928 | 16.50, Dec. 31; | 13.08, July 2 |
| 1927 | 15.25, Jan. 11; | 12.08, Nov. 22 |

Pittsburgh Steel Business and Prospects Are Improving

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PITTSBURGH, Jan. 10.—Both orders and prospects for the Pittsburgh steel industry have improved in the last week, and further gains are promised for the latter half of the month.

Tin plate specifications in the first full week of the new year showed marked improvement, the releases of one large maker having been the largest in several months. Orders for sheets and strip steel from the automotive industry continue to improve, and alloy steel bars have been more active. While structural steel awards have not been holding up to the recent average, tonnage releases on old projects are increasing, and local mills expect to increase their production of shapes rather materially before the end of the month. Although the pipe market is rather quiet, an order for 4000 tons of electric weld material has been placed with a Valley maker.

The prospect of increased purchases by the railroads has improved since the turn of the year, although definite inquiry is slow to come out. Demand for plates for river craft construction has been given impetus by the purchase from a local maker of six barges, which will require 1500 tons. Specifications for finished steel generally are improving, and even companies which had better business in December than in the preceding month are able to report further increases in January.

Improved schedules, particularly by the smaller independents, have raised steel ingot production in the district to about 14 per cent of capacity, with the promise of further gains as the week progresses. Finishing mill operations have developed marked improvement in the case of tin plate, and to a less extent in sheets, strips and bars. Steel-making capacity in the Valleys is engaged this week at about 16 per cent, while production in the Wheeling district has risen to 35 per cent. Improved tin plate schedules are responsible for much of the gain in the latter center.

The most unfavorable factor in the current picture is price weakness, which has become more pronounced on a number of products, particularly sheets. Most of the principal finishes of sheets are quotable at a range \$2 under recent figures, and shading in cold-rolled strip has also become common enough to define a lower market. Although no break has occurred in the market on bars, plates and shapes, the 1.60c., Pittsburgh, figure is subject to considerable pressure whenever

Steel orders have gained at Pittsburgh, particularly in tin plate.

* * *

Ingot production rises slightly in Pittsburgh, Valley and Wheeling districts.

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Steel prices show some signs of weakness, with open breaks in quotations on several grades of sheets.

* * *

Scrap market firmer, with rise in price of heavy melting steel.

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desirable tonnages are involved. Semi-finished steel continues very firm at \$26, Pittsburgh, and the 1933 tin plate price is being well held on forward contracting.

The scrap market is strengthened by virtue of higher quotations on recent railroad lists, but pig iron continues very dull, with prices more or less nominal.

Pig Iron

Producers report little change in demand, although a merchant stack in the Valleys resumed production today, Jan. 10, for a short run. Orders for carload lots are slightly more numerous, but aggregate tonnage being shipped has not gained materially. About 600 tons of steel castings will be required for a Government lock and dam project on the Allegheny River. The castings will be furnished by a district foundry. Local foundries are bidding on approximately 4000 tons of castings required for the Hoover Dam.

Semi-Finished Steel

Shipments to non-integrated steel companies have not increased much thus far in the year, and no new buying is reported. The price of billets, slabs and sheet bars is well sustained at \$26, Pittsburgh, while forging billets are quoted at \$31. Wire rods are quiet, with prices unchanged.

Bars, Plates and Shapes

Miscellaneous Federal and State projects constitute the bulk of current structural awards, and the totals are not large. New inquiry is also rather light, and little new reinforcing bar tonnage is coming into the market. Fabricating shops in the district have some tonnage on their books, but it is being worked off more rapidly than

replacements are coming in. A large interest is engaged at about 40 per cent of capacity, but many of the smaller shops are entirely idle. The plate market is quiet, but there is promise of some railroad tonnage. The Norfolk & Western has made plans to rebuild 500 freight cars later in the year, and the Reading may double its repair program. A fair tonnage of plates is also called for in Government river craft, for which plans are now being prepared. Bars are quiet except in the automobile field, where there is a fair demand. Shipments of alloy steel bars to the motor car industry are also well sustained.

Prices on heavy hot-rolled products show no quotable change, but still tend toward weakness, particularly on plates and shapes. Deviations from the 1.60c. quotation on bars are rare, although reinforcing bars are now openly quoted at 1.50c., Pittsburgh.

Rails and Track Accessories

The Atlantic Coast Line has closed with Southern makers for 5000 kegs of spikes. The Santa Fe is also reported to have placed accessory tonnage in the West. Pittsburgh makers have received no new releases on rails or track supplies, and definite inquiries from the important carriers are lacking.

Bolts, Nuts and Rivets

Shipments to the automotive industry have been slightly heavier, but movement to the railroads has declined. Demand generally this month is no better than it was in December, and operations continue at a low rate. Prices are well maintained.

Cold-Finished Steel Bars

Shipments to the automotive industry are fairly well maintained, but demand from other sources is very light. The January tonnage is running ahead of December with most producers, but the industry's capacity is engaged at a very low rate. The base price of 1.70c., Pittsburgh, is well sustained.

Tubular Goods

The Republic Steel Corp. has taken 4000 tons of 5, 6 and 8-in. electric welded pipe for use in the Metropolitan Water District improvement at Los Angeles. No other large tonnages have been placed, and the market has been exceptionally dull thus far in the new month. Demand from the oil country is not holding up, and the uncertainty of conditions in the Texas fields is not conducive to buying. De-

mand for standard pipe shows no change, but mechanical tubing is moving slightly better.

Wire Products

Business has not improved since the first of the year, although jobbers have given some promise of replenishing their stocks in the near future. Manufacturers' wire is very quiet, although makers of automobile wheels and other accessories are taking fair tonnages. Prices are holding, with manufacturers' wire quoted at 2.20c., Pittsburgh, and wire nails at \$1.95 a keg.

Sheets

Shipments to the automobile industry are holding up as well or better than they were in December, and some mills booked considerable tonnage last week. However, Pittsburgh producers are not sharing heavily in this business, the bulk of it going to Detroit and Cleveland mills. Demand for sheets from other sources is very dull and shows no change since the first of the year.

Recent price weakness on sheet mill products has crystallized into a general lowering of the quoted levels on the principal lines. Hot-rolled annealed sheets are now quotable at 2c. to 2.10c., Pittsburgh, with 2.20c. no longer applying on any significant tonnage. Galvanized material is more freely available at 2.75c., Pittsburgh, and No. 10 gage hot-rolled and hot-rolled annealed sheets are quotable at \$2 under the recent figures. Light cold-rolled sheets are selling at 2.40c. to 2.50c., and long ternes are available at 2.70c. Tin mill black is unchanged at 2.30c., Pittsburgh.

Tin Plate

Improved specifications in the last week have resulted in heavier operations by most of the large makers, and the industry is now engaged at 40 to 45 per cent of capacity. At least four large plants are running at an even higher rate, but the leading interest is engaged at slightly under 40 per cent. The 1933 price of \$4.25 a base box, Pittsburgh, is very well maintained. Forward contracting is still proceeding slowly.

Strip Steel

Business has improved slightly in the last week, but operations are no more than holding their own at about 15 per cent of capacity. Some units which were not active last week have fairly good schedules, but insufficient tonnage is coming out to enable the smaller mills to run every week. The price of hot-rolled strip is well maintained at 1.45c., Pittsburgh, but cold-rolled is now quotable at 1.90c. to 2c., the lower figure being available to large and moderate-sized buyers.

Coal and Coke

The market is still quiet, although shipments of foundry coke have improved slightly since the first of the year. Furnace coke is finding little demand, while a merchant stack in

the Valleys which will resume production this week will provide a new outlet. Domestic coke is quiet, and movement of coal is considerably below expectations.

Scrap

Following a tendency toward weakness at the year end, the scrap market has strengthened appreciably, and half of the 50c. reduction on No. 1 heavy melting steel last week has been regained. Railroad steel has been taken

by two consumers at \$9, and a sale of ordinary No. 1 material is reported at \$8.50. At the same time dealers are able to purchase scrap to fill old orders at as low as \$8, and the market has become quotable at a range of \$1 a ton. The other grades are still quiet, with few sales into consumption reported. Dealers are paying \$6.25 for machine shop turnings for at least two points. Negotiations for a sale of No. 1 cast at \$9.50 are in progress, bringing this grade to a lower level.

Pittsburgh Steel Companies Favor Reduced Freight Rates to Detroit

APPROVAL of a proposed reduction in freight rates on steel shipments from the Pittsburgh district was voiced at a meeting of the Pittsburgh Independent Steel Traffic Association held last week. Following a discussion of a plan outlined by J. A. Coakley, general traffic manager for the United States Steel Corp., for reducing rates on certain steel articles shipped from Pittsburgh and Youngstown districts to Detroit, Toledo and Cleveland, a joint meeting of independent steel company traffic managers with Steel Corporation representatives was scheduled. The proposal will be given a public hearing at the William Penn Hotel on Jan. 13 before representatives of the Central Freight Association, the Trunk Line Association and the New England Freight Association.

It is suggested that the rate from Pittsburgh to Detroit be reduced to 20c. per 100 lb., as compared to the present rate of 26½c. exclusive of the surcharge. Other changes proposed are as follows: From Youngstown to Detroit, 15c. a 100 lb. as compared with 23c.; from Pittsburgh to Toledo, 20c. as compared with 23½c.; from Youngstown to Toledo, 15c. as compared with 20½c.; from Pittsburgh to Cleveland, 13c. as compared with 18½c., and from Youngstown to Cleveland, 8c., as compared with 12c. All of the existing rates mentioned are without the surcharge.

Chicago Machine Tool Appraisal Plan Revised

Chicago machine tool dealers have adopted a modified appraisal plan for the purchase of used machine tools to conform to the "cease and desist" order issued by the Federal Trade Commission on Sept. 29, 1932, against the plan that was formerly in effect. The Trade Commission, it is stated, will permit the Chicago machine tool dealers to operate the revised plan with the understanding that at the end of a year a study will be made of the manner of operation.

The modified plan retains the regi-

stration of bids formerly employed but distinguishes "firm offers" from "allowances." The member making the bid has the option of choosing between these two forms. If he makes a firm offer, he becomes obligated to accept the traded in machine whether he gets the new machine order or not. If he makes an allowance, he does not agree to take the old machine unless he receives an order for the new.

Unfilled Steel Orders Off Only 161 Tons

Unfilled orders of the United States Steel Corp. as of Dec. 31 declined only 161 tons, the total at the end of the year having been 1,968,140 tons. This was the second consecutive decline following three consecutive monthly increases.

U. S. Automobile Output in November 59,556 Cars

WASHINGTON, Jan. 10.—Motor vehicle production in the United States last November rose to 59,556 units from 48,702 in October, according to reports received by the Bureau of the Census from manufacturers. The November total consisted of 47,293 passenger cars, 12,024 trucks and 239 taxicabs.

Construction Work on Pacific Coast Planned

SAN FRANCISCO, Jan. 9.—The California State Highway Department has announced a program for projects to be placed under contract before July 1 at a cost of \$5,645,064. The Highway Commission and the Department of Public Works have submitted their proposed budgets, which call for \$16,700,000 in construction in the period from July 1, 1933, to July 1, 1935. As paving and bridges figure very large in this program, the steel tonnage should be considerable.

The general contract for the construction of the San Gabriel Dam No. 1 has been awarded.

Chicago Trade is Little Improved; Ingot Output Not Increased

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CHICAGO, Jan. 10.—The Chicago steel market shows only few and scattered signs of awakening from the holiday period. Both sales and specifications for finished steel are still near the December average. Some improvement is noted in inquiries, but the average tonnage being sought is small.

Wire sellers believe that January shipments will improve as the month advances, but other steel producers, finding that only automobile manufacturers are lending real support to the market, are far more cautious in trying to appraise the future. Railroad business is almost wholly lacking except for larger spot purchases of track supplies. The outlook in the structural field is far from encouraging.

Ingot output remains at 9 per cent of capacity, with a rather poor prospect of improvement in the very near future.

The scrap market has changed from a heavy to a mixed tendency. Consumers have suddenly awakened to the fact that there is actually a scarcity of some grades, and prices for these are advancing. However, prices for some other grades are lower, while quotations on heavy melting steel remain stationary.

Pig Iron

The upward climb in shipments is still in evidence, though it is now at a slower rate than immediately after the turn of the year. Fresh inquiries are scattered and usually are of small size. Prices for this kind of business are steady at \$15.50 with full differentials. Small lots of dock iron in a limited number of grades are moving at prices below the general market.

Cast Iron Pipe

In the absence of quantity buying, prices for cast iron pipe are steady at \$32 to \$33 a ton, Birmingham, for 6 in. and larger diameters. In fact, the \$32 price is applying to orders of 200 tons and larger. Business is coming to sellers in very small and infrequent lots. The largest prospective tonnage is that of the Wilmette, Ill., water plant. Fort Wayne, Ind., is readvertising for 150 tons.

Sheets

This market continues dull, though somewhat better support is coming from automobile manufacturing centers. A moderate increase in shipments from warehouses has brought no additional business to local mills,

Chicago market sees few signs of awakening from holiday dullness.

* * *

Ingot output remains at 9 per cent capacity.

* * *

Scarcity of some grades of scrap increases prices, though heavy melting steel is unchanged.

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which still must await the accumulation of tonnage before starting rolling schedules. Prices still tend to sag in spots, with galvanized sheets now quotable at 2.85c to 2.95c a lb., Chicago mills.

Structural Material

Fabricating shops in the Chicago area are not engaged at more than 10 per cent of capacity, and inquiries now before the trade do not indicate that even this low rate can be maintained. A Chicago fabricating shop is liquidating, the second to take this course in about a year. Totals now compiled show that inquiries and sales in December were the lowest on record. It is reported that the steel needed for the New Orleans bridge will be fabricated near seaboard and sent by boat to the site of erection.

Plates

Information is reaching Chicago from the West and Southwest that considerable refinery improvement work and even some new properties are needed by oil companies. In several instances plans are completed, but this work is being held back by inability to finance the projects. The plate market in general is dull with the exception of the 4000 tons of steel pipe needed by Denver, Colo. It is expected that bids will be opened this week.

Wire Products

Wire mills have neither lost nor gained ground in output in the opening days of the new year. Inquiries are more numerous and the trade has come to believe that shipments will gain before the end of January and that the month as a whole will be better than December. An improvement is noted in electrical wire demand, a number of small orders having been received recently from public utilities.

Rails and Track Supplies

The upturn in demand for track

supplies is further accelerated, and indications are that January shipments will be above those of December. The rail market is dull, though mills are still producing small quantities on old orders.

Bars

The bulk of bar business now reaching mills is coming from automobile manufacturers, but general inquiry is turning upward and the outlook is more favorable than at any time in more than a month. Recent orders from automobile plants are heavier, but sellers are cautious in predicting the future, stating that measure must first be taken of the success of automobile shows.

Reinforcing Bars

This market is dull except for the prospect that Illinois road and bridge steel will soon be bought. Bids taken in November are rapidly being turned into general contracts and low bidders are being announced on the bids taken in December. About 3000 tons is involved. Dealers expect that contractors will start buying steel soon after mid-January.

Bolts, Nuts and Rivets

Releases show no improvement thus far in the new year.

Coke

The movement of foundry coke has made a gain each month since July, which was the low point for this industry. Releases indicate that this upward tendency will continue in January.

Scrap

Tendencies in this market are mixed. Prices for some grades are sinking to lower levels, but shortages in other grades have resulted in price advances. Coil springs and iron car wheels are two grades of railroad scrap in which there is an actual shortage, and steel axles are being sought eagerly in a poorly supplied market. Heavy melting steel is steady at \$5.50 a gross ton, delivered consumers' yards, as gaged by several small-lot sales. All foundry grades are quiet.

Detroit Scrap Dull

DETROIT, Jan. 10.—Purchases of scrap in the past week have been meager. Prices of some items are showing a weak tendency, but are nominal in the absence of transactions to test the market. The local steel plant is buying small lots of scrap to take care of current requirements.

Eastern Pennsylvania Steel Trade Still Extremely Dull

Slightly Increased Inquiry for Pig Iron Develops—Reading Railroad May Increase Car Repair Program

PHILADELPHIA, Jan. 10—Demand for pig iron and steel is still extremely dull, although there has been a slight improvement in pig iron. Eastern Pennsylvania mills are operating on a light basis as they have no backlogs and orders for immediate requirements are very small. The railroads have indicated no buying movement of important proportions. The Reading alone gives promise of coming into the market soon for material for an enlarged car repair program. It is reported that this road will increase considerably the 3000 cars which were some time ago placed on the repair list. Unfilled requirements for the original car repair program are estimated at about 1000 tons of steel. The additional cars to be repaired may run as high as 3000, but apparently no definite program has been determined upon.

One additional open-hearth furnace has been put into service in eastern Pennsylvania, bringing production in the district up to about 10½ per cent of capacity. Another furnace may be added next week provided anticipated business is received.

Pig Iron

Slightly increased inquiry has come out. Demand is confined to carlots for immediate melting.

Plates, Shapes and Bars

The market is dull. It is reported that the Reading Railroad may enlarge its car repair program from 3000 to 6000 units. The plate market is weak. While merchant bars are stronger than shapes, the market for the latter appears to have become steadier the past week. The Concrete Steel Co. has been awarded 650 tons of reinforcing bars for the Philadelphia post office. No award has been made for either the Market Street viaduct in Philadelphia, requiring 750 tons of fabricated material, or the bridge over the Hackensack River near Rutherford, N. J., requiring 2300 tons. The McClintic-Marshall Corp. was awarded 80 tons for a bridge for the Lehigh & New England Railroad, near Catasauqua, Pa.

Imports

Imports at Philadelphia last week consisted of 973 tons of pig iron from British India and 502 tons of the same product from Asia.

Scrap

A fair-sized tonnage of No. 1 railroad wrought has been sold to a mill in this district at \$8.25. Sales of yard wrought are reported to have been made at \$5 to \$5.50. A small lot of car axles went at \$12, eastern Pennsylvania mill.

fair rate, and January specifications have been slightly heavier. Bars and plates are quiet, and wire products are moving in limited volume.

Steel ingot production has averaged about 15 per cent of capacity thus far in the month, and is fully sustained by the demands of finishing mills. Sheet production averages about 20 per cent, and strip mills are running at about the same rate. Output of tin plate in the Valleys is holding at about 50 per cent of capacity.

Finished steel prices show no change, and mills have been able to hold quotations in effect on previous contracts. Attempts to advance prices were not generally successful, but at the same time producers have been able to hold against reductions. Raw materials are particularly dull, with practically no demand for pig iron reported. There has been no recent buying of scrap, as one large consumer has been able to meet its needs largely through its own production.

Birmingham Market Lacks Signs of Betterment

BIRMINGHAM, Jan. 10.—The pig iron market still lacks signs of betterment. Sales and shipments since the first of the year have been extremely small. One large pipe plant, which had expected to resume work on Jan. 2, did not do so and may not operate during the present week. Work at other foundries has likewise been on a small scale. Since the first of the year only two blast furnaces have been operating, and late this week there may be only one. The Woodward Iron Co., which banked two stacks the middle of December, had expected to resume production with one about the middle of this month, but it is now a question when there will be a resumption. The quotation of \$11 for the Southern market is unchanged.

Steel

Before January is over jobbers are expected to furnish enough new tonnage for the month to show an improvement over December, but this new business has not yet materialized to any extent. Industrial, construction and farm lines are sluggish. The jobbing trade is the main hope for the month. The buying of the jobbers in November and December was reduced considerably and their stocks are now at a low point and need replenishing even for routine daily demands. Five open-hearth furnaces were operated through last week, but this week there are only two, the Tennessee company having shut down its Fairfield plant for a week.

Philadelphia dealers in iron and steel scrap who recently formed an organization called the Scrap Iron Club have changed the name to the Ferro Club. Furman Mather of Frank Samuel & Co. is president.

Valley Steel Mills Experiencing Gradual Improvement in Tonnage

YOUNGSTOWN, Jan. 10—With the continued support of the automotive industry, Valley steel producers are experiencing gradual improvement in tonnage. The fact that December business held up far better than had been expected has tended to make the January upturn less pronounced than it usually is, but small miscellaneous consumers of steel are gradually resuming their takings, and a few outstanding orders have helped considerably. At least one large producer in this district reported heavier orders in December than in the preceding month, and others were able to hold their own. In view of the fact that December usually brings a sharp contraction in buying, the results in the past month were especially encouraging.

Large fabricators in the Youngstown district have begun the new year

auspiciously. A substantial tonnage of sheets will be required for an order for 80,000 electric refrigerator boxes. Although these boxes will be produced in Cleveland, the Valleys will share heavily in the raw materials required. Other steel consumers in the Youngstown territory plan to increase production in the near future to build up depleted inventories, and the outlook for the next two months is rather hopeful. Shipments to the automobile industry during January promise to be heavier than they were in December. The outlook in other industries on which Valley mills are dependent is not clearly defined, but several pipe making units got under way last week, and demand from the oil country is not entirely lacking. Line pipe business is seasonally quiet, but negotiations for spring activity will soon begin. Tin mills are running at a

Cleveland Steel Production Remains at 35 Per Cent

Output Fairly High, Mainly on Automobile Orders, With General Trade Showing Little or No Improvement

CLEVELAND, Jan. 10.—January has made a poor start in the demand for finished steel. Improvement that was looked for after the year-end inventories has failed to materialize. While some orders are coming from manufacturing consumers, these are limited to very small lots. The automotive industry placed some small orders during the week, but these were mostly of a fill-in nature. Some of this business came from the local Fisher Body plant.

Some of the makers of automobile parts are slowing down their production schedules, and signs point to a reduction in output after the middle of the month by some automobile manufacturers, who by that time will have their dealers well supplied with cars. Several leading automobile manufacturers evidently now intend to mark time while waiting results of the automobile shows in order to determine the extent of the consumers' demand for cars. Production of automobiles during the next few weeks doubtless will depend largely upon dealer sales. The electric refrigerator industry appears to be the only one that is showing renewed activity, and this has resulted in some good business in enameling sheets.

Ingot output in Cleveland is being maintained this week at 35 per cent of capacity or the same rate as last week. Local sheet and strip mills are operating at about 35 per cent.

Demand from railroads is still limited to minor requirements. Car repair parts are moving fairly well. Only two railroads with headquarters here, the Chesapeake & Ohio and the Erie, are expected to buy rails this year.

Prices are being well maintained on all products except sheets, which have developed considerable weakness. Hot-rolled annealed sheets are being sold at 2.10c., Pittsburgh, the announced advance for the current quarter not having become wholly effective. Prices on most other grades are being shaded \$2 a ton.

Pig Iron

Inquiry has improved since the first of the month and sales have gained slightly. A leading interest sold 2000 tons during the week. Quite a few inquiries, all for small lots for the first quarter, have come from foundries that deferred making commitments until after the first of the year. Shipments also have started better this month than during December. This gain is due to some releases from foundries making automobile castings.

The market lacks firmness for deliveries at competitive points, and silicon differentials are reported to have been waived in some cases.

Iron Ore

Little ore is moving from docks. Shipments from Lake Erie docks during December were 28,864 tons compared with 174,885 tons during December, 1931. The dock balance Jan. 1 was 5,162,251 tons against 5,874,235 on the same date a year ago.

Bars, Plates and Shapes

Demand for these products continues slack. One Cleveland contractor has placed 725 tons of structural steel for a reformatory in Elmira, N. Y. Other lettings have been for small lots and little inquiry is pending. Six Ohio River barges requiring 1400 tons of plates have been placed. No deviation is reported in this territory from the regular prices of 1.65c., Cleveland, for bars, and 1.60c., Pittsburgh, for plates and shapes.

Sheets

Good orders for enameling sheets, largely from the electric refrigerator industry, served to increase activity during the week. Some of the manufacturers in this field have placed orders for refrigerator cabinets covering their 1933 requirements. Some additional tonnage in small lots came from the automotive industry. Efforts to establish hot-rolled annealed sheets at 2.20c., Pittsburgh, seem to have failed and eagerness of sellers for business has resulted in weakness on all other grades except enameling stock, with concessions of \$2 a ton from recently quoted prices.

Strip Steel

Specifications for hot-rolled strip from the automotive industry have declined because of reduced schedules of some plants making parts for automobile companies that recently have maintained good production. These parts plants are covered for their January requirements, but have not yet made purchases for more extended deliveries. The market is firm at 1.45c., Pittsburgh. Cold-rolled strip is quiet, with prices unchanged at 1.90c to 2c., Cleveland, the lower price apparently having become more common.

Bolts and Nuts

A fair volume of business in bolts and nuts continues to come from the automotive industry, and orders from railroads have improved. No business

has come from jobbers this month. Rivets remain quiet, although there is a slight improvement in the demand from railroads, which are credited with about 95 per cent of the business at present.

Scrap

No activity has developed since the start of the year and no increase in the limited releases is in evidence. Some buying is looked for shortly. In the absence of demand, prices are nominal.

Canadian Industry is Virtually Stagnant

TORONTO, Jan. 9.—During the past two or three weeks virtual stagnation has prevailed in the Canadian iron and steel markets. While the general business depression took its toll, the holiday season and inventory taking were other contributing factors. Toward the end of the week, however, there was some indication of a small revival. Some good orders are in prospect from the automotive industry, but otherwise there is little prospective demand for finished or semi-finished steel products.

Pig Iron

In this market sales are at a minimum. Pig iron production is running slightly above the average for last year as a result of increased operations at the plant of the Dominion Steel & Coal Co., Sydney, now producing rails against a 15,000-ton order for the Canadian National Railways. The greater part of current output, however, is basic iron. Pig iron prices remain firm.

Scrap

Some special grades are beginning to revive, but no large contracts or orders have appeared recently. Steel mills are not buying, with the result that there is no movement of heavy melting steel or other steel-making grades. Montreal dealers also report that the market demand for steel scrap has dried up.

Steckel Mill Patent Held to Be Valid

According to a decision handed down on Jan. 9 by the United States District Court at Pittsburgh, Steckel Patent No. 1779195, covering the four-high roller bearing mill, is held to be valid in all of its claims. It is also held that the defendant, the United Engineering & Foundry Co., Pittsburgh, is entitled to a license under the patent.

The United company had contended that the patent was invalid, particularly in view of the mill of the American Tube & Stamping Works, Bridgeport, Conn. The plaintiff in the case was the Cold Metal Process Co., Youngstown.

Weakness in Sheets and Plates in the New York Market

Common Grades of Sheets Are Off \$2 a Ton—Moderate Improvement in Steel Orders, Especially Tin Plate

NEW YORK, Jan. 10.—Open breaks in prices of various grades of sheets and more widespread weakness in plates have developed on January business. Weakness also persists in structural shapes. What may be described as a creeping weakness has developed in sheets. Although concessions were granted by some makers in December, these were more or less ignored by other mills until the past week. No. 10 gage hot-rolled and hot-rolled annealed, No. 24 gage hot-rolled annealed, galvanized, No. 20 gage cold-rolled and long ternes are off \$2 a ton in their minimum quotations. On No. 24 gage hot-rolled annealed, the 2.20c. quotation which was announced some time ago is not only out of the picture almost entirely, but the larger buyers are able to place orders at 2c., Pittsburgh.

The weakness in plates began some months ago, but for a considerable time was ignored by the larger makers. Plate quotations are "all over the map," and it is difficult to define the actual market price with exactness. On a Coatesville basis, quotations range from 1.50c to 1.70c on the ordinary lots, but it is seldom that a mill can now obtain 1.70c except for what might be termed warehouse quantities. On the other hand, quotations on the larger lots have gone at prices well below 1.50c, Coatesville.

A modicum of improvement in orders occurred during the past week, but not all companies or all products were affected alike. In fact, some companies report that their orders in this district have not gained at all this month, while others have had a minor improvement. Where tonnage increases have occurred, tin plate specifications have been an important factor. The heavy products—bars, plates, shapes, pipe and plates—have scarcely improved at all.

Pig Iron

This market continues to be a drab affair. Even spot buying of car lots fell off during the past week, with bookings aggregating only 700 tons, compared with 800 tons in the preceding period and 1000 tons a fortnight ago. The failure of most foundries to expand their melts since the holiday recesses is shown by the absence of new inquiries. Not more than 150 tons was inquired for during the week. Though there are no definite indications as to prospects for the remainder of the month, some sellers still cling to the hope that a moderate amount of replenishment buying will

materialize soon. As a result of the current dull situation, prices are virtually nominal.

Reinforcing Bars

Preliminary estimates place the bar requirements for the St. John's freight terminal for the New York Central Railroad at about 250 tons. Bids for this project will be submitted the last week in January. Other demand is for miscellaneous small lots. Highway projects in New York, taking 250 tons, accounted for the bulk of last week's awards in the district. Weakness in prices is still prevalent. While the Pittsburgh base quotation of 1.75c a lb., or 2.10c., delivered New York, is nominally unchanged on small lots, the highly competitive character of bidding on public works projects continues to force concessions.

Scrap

Important movement of scrap is still restricted to barge loading of No. 1 and No. 2 heavy melting steel against standing orders for export to Europe and Japan. Dealer bidding for No. 1 steel has stiffened the price for that grade, which is procurable mostly at \$4.50 a ton, on barge, though a limited quantity is understood to be available at \$4. Stove plate is still being loaded on barges at \$4.50 a ton for delivery to Bayonne, N. J. Fresh demand from Eastern mills is negligible, while interest in cast scrap is dormant.

Pig Iron Shipments Gaining at St. Louis

ST. LOUIS, Jan. 10.—The local maker reports that indications are that its shipments during January will be 20 per cent ahead of those of December, but new business shows no improvement. An encouraging report is that a local steel mill is planning to increase its operations considerably. Basic iron melt has fallen off, and there is little doing in the malleable trade. Prices are unchanged.

Steel

Open-hearth operations in the St. Louis industrial district were increased during the week to about 7 per cent of capacity.

Because of changes in administrations in a number of the States in the St. Louis trade territory, new highway projects are being held up temporarily. Other building projects are also at a standstill. Buying by manufacturers of steel products has not in-

creased with the new year. Railroads have made no first quarter purchases.

Scrap

The scrap market continues dull, with prices nominally unchanged. Neither mills nor dealers are inclined to buy at this time. Railroad lists: Baltimore & Ohio, 8500 tons; Kansas City Southern, 1655 tons; Wabash, 244 tons; New York, Chicago & St. Louis, 36 carloads and St. Louis-Southwestern, 27 carloads.

Buffalo Pig Iron Sales in Carloads Gaining

BUFFALO, Jan. 10.—Producers continue to report an accumulation of carload shipments. No large transactions are reported, nor are there any sizable inquiries in the market.

Steel

The Lackawanna plant of Bethlehem Steel has increased its open-hearth operation to four units. Republic's plant is idle. Wickwire Spencer is operating one open-hearth, and the Seneca sheet division of Bethlehem is operating at about 20 per cent. A State bridge at Hancock, N. Y., requiring 500 tons of structural steel, is reported let.

Scrap

The first important transaction in months occurred last week when a Buffalo mill purchased 2000 tons of No. 1 heavy melting steel at \$7.25. At the same time this mill is giving releases against old orders for No. 2 heavy melting steel. Dealers believe that this transaction indicates a firming tendency in the market and are of the opinion that ensuing sales will be at a higher figure. Dealers are supplying this tonnage from local accumulation and state that, if it were necessary to go outside the district on subsequent purchases, a higher price would be indicated. Odd lots of stove plate have been sold outside the city at \$8.

New England Demand for Pig Iron Still Light

BOSTON, Jan. 10.—Pig iron sales the past week approximated 600 tons. A Connecticut melter is inquiring for three cars of low manganese iron, but otherwise there is little business in sight. The New England melt is the lowest on record. A recent buyer of Dutch iron has also taken some trial lots of Indian iron, but otherwise foreign iron has not moved. The Mystic Iron Works booked more than half of the total iron sold during the week.

The movement of textile and No. 1 machinery cast out of New England yards is perhaps a little more active, but the scrap market generally continues in the doldrums.

Fabricated Structural Steel

Awards 5700 Tons—New Projects Total Only 4300 Tons

FABRICATED steel lettings, at 5700 tons, show a sharp drop from last week's total of 67,100 tons, which was swelled by a single award, 60,000 tons for the New Orleans Belt Line bridge. New projects, at 4300 tons, are also very light, comparing with 29,833 last week. Both lettings and inquiries are made up mainly of public projects.

NORTH ATLANTIC STATES

Brookline, Mass., 160 tons, Deaconess Hospital unit, to New England Structural Co.
Elmira, N. Y., 725 tons, reformatory, to Ingalls Iron Works Co.
State of New York, 175 tons, highway bridge in Genesee County, to McClintic-Marshall Corp.
Hancock, N. Y., 500 tons, to American Bridge Co.

SOUTHWEST

Prague, Okla., 450 tons, bridge, to J. B. Klein Iron & Foundry Co.
State of Oklahoma, 375 tons, beam and truss spans, to Muskogee Iron Works.
State of Oklahoma, 175 tons, highway bridge in Johnston County, to Virginia Bridge & Iron Co.
Sawyer, Okla., 750 tons, Kiamichi River bridge, to Muskogee Iron Works.

CENTRAL STATES

Goldwater, Mich., 105 tons, highway bridge, to Milwaukee Bridge Co.
Springfield, Ill., 520 tons, dam, to Mississippi Valley Structural Steel Co.
Springfield, Ill., 110 tons, subway for New York Central Railroad, to R. C. Mahon Co.

WESTERN STATES

Grand Junction, Colo., 640 tons, bridge, to Minneapolis-Moline Power Implement Co.
Lewis and Clark County, Mont., 284 tons, bridge and approaches over Missouri River, to an unnamed bidder.
Sheridan County, Wyo., 250 tons, State highway bridge, to an unnamed bidder.
Harpster, Idaho, 123 tons, bridge over Clearwater Creek, to Minneapolis-Moline Power Implement Co.
Benton County, Ore., 156 tons, State highway

bridge over St. Mary's River, to an unnamed bidder.

San Francisco, 135 tons, trestle bents for Golden Gate project, to Moore Dry Dock Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Hartford-East Hartford, Conn., 1800 tons, bridge.
Newport, R. I., 300 tons, Naval war college addition.
Newport, R. I., 150 tons, bridge for Government.
Willard, N. Y., 150 tons, State hospital building; Crowell & Little Construction Co., Cleveland, general contractor.
State of New York, 440 tons, highway bridge in Ulster County; bids in.

CENTRAL STATES

Iron Mountain, Mich., 450 tons, Interstate highway bridge over Menominee River.
Iowa City, Iowa, 265 tons, building for University of Iowa.
Chicago, Burlington & Quincy Railroad, 150 tons, bridge at Homer, Neb.

WESTERN STATES

Los Angeles, 900 to 1000 tons, Silver Lake Boulevard grade separations.

FABRICATED PLATE

AWARDS

Cincinnati, 1500 tons, six barges for Barrett Line, to American Bridge Co.
Galveston, Tex., 130 tons, Government work, to Wyatt Metal & Boiler Co.
Mare Island, Cal., 200 tons, four 1000-hp. boilers, to Consolidated Steel Corp.

NEW PROJECTS

Vicksburg, Miss., 300 tons, 40 steel pontoons for United States Engineer.

San Diego, Cal., 100 tons, State Teachers College gymnasium.

San Diego, 200 tons, tunnel at Navy base.

Orange County, Cal., 110 tons, State highway paving between Irvine and Tustin; bids Jan. 25.

San Bernardino County, Cal., 365 tons, State highway paving; bids Jan. 25.

Barstow, Cal., 100 tons, State highway bridge; bids under advisement.

Los Angeles County, 152 tons, State highway near Gorman; bids Jan. 11.

Seattle, 1178 tons, additional tonnage on Railway Avenue seawall.

Los Angeles, Cal., 250 tons, Silver Lake Boulevard grade separations.

Pipe Lines

Public Service Co., Sunbright, Tenn., D. S. G. Jones, president, is planning 10-in. steel pipe line from Sunbright to Lenoir City, Kingston, Maryville, Tenn., and vicinity, connecting with line from Morgan County gas fields, for natural gas supply, about 80 miles. Cost over \$400,000.

Northern Natural Gas Co., Rochester, Minn., is considering extensions in steel pipe line for natural gas supply at Faribault and Northfield, Minn.

Michigan Natural Gas Corp., care of Bliss Keeler, East Lansing, Mich., head, has secured permission for new steel pipe line from Mount Pleasant fields to Bay City and Saginaw, Mich., about 30 miles. Cost over \$250,000. Consumers Power Co., Jackson, Mich., is interested in development and will distribute natural gas at two cities noted.

Ajax Pipeline Co., Springfield, Mo., and Oklahoma Pipeline Co., Muskogee, Okla., have arranged for merger, and headquarters in future will be located at last noted place. Extensions in systems are planned.

Metropolitan Water District, Los Angeles, has awarded 4000 tons of light walled 5 to 8-in. electric welded pipe to Republic Steel Corp.

Cast Iron Pipe

Cambridge, Mass., has closed bids on its 1933 requirements of 100 tons; Warren Foundry & Pipe Corp. was low bidder.

Boston has closed bids on 150 tons of branches and curves; Warren Foundry & Pipe Corp. was low bidder.

Corpus Christi, Tex., has awarded 550 tons of 4 to 12-in. to National Cast Iron Pipe Co.

San Francisco has awarded 610 tons of 6-in. to Central Foundry Co.

Solidad, Cal., will take bids Jan. 18 on 197 tons of 2 to 8-in. with alternatives of steel and cast iron.

Fort Lewis, Wash., will take bids Jan. 24 on 264 tons of 4 to 16-in.

Bremerton, Wash., has awarded 100 tons of 6 to 12-in. to United States Pipe & Foundry Co.

Railroad Equipment

Cheswick & Harmer has ordered one 0-4-0 type oil electric locomotive from Baldwin Locomotive Works and Westinghouse Electric & Mfg. Co., latter concern to furnish electrical equipment and power plant.

Northern Pacific has placed 930 tons of tie plates with Pacific Coast Steel Corp.

Potts Company, 117 Years Old, Is Incorporated

Horace T. Potts & Co., who operate the oldest steel warehouse in Philadelphia, have become incorporated as the Horace T. Potts Co. after a long existence as a partnership. The Potts firm is one of the comparatively few business concerns in the country that have had a continued existence for more than a century and all of that time in control of the direct male line of one family. The business was established in 1815 by William Lukens Potts, the great-great-grandfather of the youngest generation of the Potts family now engaged in the business.

For 108 years the Potts firm remained in one neighborhood, near Second and Race Streets, Philadelphia, and twice during that time, in 1854 and again in 1898, built a new warehouse which was the last word in modernization in its day. In 1923, the present modern plant at East Erie Avenue and D Street was erected.

The Potts company is Philadelphia wholesale distributor in certain lines for the Bethlehem Steel Co., Union Drawn Steel Co., American Sheet & Tin Plate Co., Carpenter Steel Co., Page Steel & Wire Co., Blaw-Knox Co., Detroit Seamless Steel Tube Co. and other mills.

Officers of the Potts company are: Harrison I. Potts, president; Guy P. Bible and Horace M. Potts, vice-presidents; Thomas C. Potts, treasurer, and Morris E. Neeley, secretary.

Reinforcing Steel

Awards 1600 Tons—New Projects 3100 Tons

Newton, Mass., 200 tons, sewer, to Truscon Steel Co. and Barker Steel Co., jointly.
State of New York, 150 tons, highway construction in Delaware County, to Kalman Steel Corp.

Queens County, N. Y., 100 tons, State highway construction, to Kalman Steel Corp.

State of Mississippi, 250 tons, State highway work in Monroe County, to Virginia Bridge & Iron Co.

State of Louisiana, 600 tons, five bridges, to Concrete Steel Co.

Otero County, N. M., 179 tons, Federal highway structure, to an unnamed bidder.

Ventura County, Cal., 122 tons, National Forest highway, for Bureau of Public Roads, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

New York, 250 tons, St. John's Freight terminal for New York Central; bids Jan. 24.

Milwaukee, 105 tons, United States Engineer office; bids close Jan. 17.

Canal Zone, 240 tons, Panama Canal work; Gulf States Steel Co., low bidder.

Los Angeles County, 3837 tons, San Gabriel Dam No. 1; general contract awarded, steel to be purchased by Los Angeles County Flood Control District.

Lower Tin Price Brings Out Buying; Zinc Declines in Quiet Market

NEW YORK, Jan. 10—With most copper consuming lines still confronted with vague prospects for the current year, interest in the red metal continues at a low point. Inventories apparently failed to reveal any urgent need for replenishment with the result that market activity has remained virtually at dead center since the close of the year. More frequent releases against standing orders, however, have been in evidence during the post-inventory period. Despite a lack of buying support prices reflect a fairly steady tone. Although there are intimations that the Connecticut basis of 5c. a lb. may apply for delivery into second quarter, most smelters are adhering to a price of 5.12½c. for that period. Primary producers are still out of the market at their unchanged posting of 6.25c., delivered Connecticut. Trading in foreign markets during the week was relatively dull. The foreign price slid off early last week from 5.10c. c.i.f. usual Continental ports, to 5c., at which level it remained until today, when a moderate demand stimulated a slight recovery to 5.05c. Lake copper remains inactive at 5c., delivered New York.

Tin

Active selling by a large London interest, which is understood to have been acting for the international group, forced a sharp drop on January 4 in the New York price of tin to 21.80c., the lowest level reached since Aug. 3. An immediate response emanated from American consumers, who covered rather freely at the bargain figure. Bolstered by this demand, the price recovered quickly to the current level of 22.60c. Buying interest, however, diminished with the advances in price, which subsequently absorbed strength chiefly from gains in sterling exchange. London values were slightly lower for the week, with today's quotations £146 7s. 6d. a ton for spot standard, £146 17s. 6d. for future standard and £151 7s. 6d. for spot Straits. The Singapore market was also lower today at £152 5s. United Kingdom warehouse stocks on Jan. 7 totaled 29,403 tons, a decrease of 176 tons for the week.

Lead

Demand for January metal has thus far failed to come up to expectations.

Sellers, however, are still hopeful that brisker activity will attend the latter half of the month. The restricted character of calls for February lead precludes early predictions as to probable volume of business for that month. Prices are fairly well maintained at 2.87½c. a lb., St. Louis, and 3c., New York.

Zinc

December statistics published by the American Zinc Institute disclosed production for the month of 18,489 tons, against deliveries of 15,582 tons, with a resultant increase of about 3000 tons in surplus stocks. Unfilled orders on smelters' books on Dec. 31, at 7587 tons, were the smallest on record and compare with 8640 tons on Nov. 30. Marketwise zinc remained extremely quiet throughout the week, with sales amounting to only 270 tons. Prices reflect somewhat easier tendencies. While the leading smelters maintained a nominal price position at 3.12½c., East St. Louis, or 3.49½c., New York, a sale was uncovered last week which established the market at 3.10c., East St. Louis, or 3.47c., New York. As a consequence of this competition the chief sellers admit a disposition to meet the lower price if necessary.

The Week's Prices. Cents Per Pound for Early Delivery

| | Jan. 4 | Jan. 5 | Jan. 6 | Jan. 7 | Jan. 9 | Jan. 10 |
|-----------------------------|--------|--------|--------|--------|--------|---------|
| Electrolytic copper, N. Y.* | 4.75 | 4.75 | 4.75 | 4.75 | 4.75 | 4.75 |
| Lake copper, New York | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Straits tin, spot, N. Y. | 21.80 | 22.25 | 22.30 | 22.60 | 22.60 | 22.60 |
| Zinc, East St. Louis | 3.12½ | 3.10 | 3.10 | 3.10 | 3.10 | 3.10 |
| Zinc, New York | 3.49½ | 3.47 | 3.47 | 3.47 | 3.47 | 3.47 |
| Lead, St. Louis | 2.87½ | 2.87½ | 2.87½ | 2.87½ | 2.87½ | 2.87½ |
| Lead, New York | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |

*Refinery quotation; price ¼c. higher delivered in Connecticut.
Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 5.45c. a lb., New York.
Brass ingots, 85-5-5-5, 5.50c. a lb., New York and Philadelphia.

From New York Warehouse

| Delivered Prices, Base per Lb. | |
|--|--------------------|
| Tin, Straits pig | 24.50c. to 25.50c. |
| Tin, bar | 26.50c. to 28.50c. |
| Copper, Lake | 7.50c. to 8.50c. |
| Copper, electrolytic | 7.25c. to 8.25c. |
| Copper, casting | 7.00c. to 8.00c. |
| *Copper sheets, hot-rolled | 13.62½c. |
| *High brass sheets | 11.00c. |
| *Seamless brass tubes | 13.25c. |
| *Seamless copper tubes | 12.37½c. |
| *Brass rods | 8.50c. |
| Zinc, slabs | 4.37½c. to 4.87½c. |
| Zinc sheets (No. 9), casks | 9.25c. to 9.50c. |
| Lead, American pig | 3.75c. to 4.25c. |
| Lead, bar | 5.25c. to 6.25c. |
| Lead, sheets | 6.75c. |
| Antimony, Asiatic | 8.00 to 9.00c. |
| Alum., virgin, 99 per cent plus | 23.30c. |
| Alum. No. 1 for remelting, 98 to 99 per cent | 16.00c. |
| Solder, ½ and ¼ | 15.50c. to 16.50c. |
| Babbitt metal, commercial grade | 21.00c. to 32.00c. |

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

| Delivered Prices per Lb. | |
|--------------------------|---------|
| Tin, Straits pig | 27.00c. |
| Tin, bar | 29.00c. |
| Copper, Lake | 6.125c. |

| | |
|-----------------------------|------------------|
| Copper, electrolytic | 6.125c. |
| Copper, casting | 5.875c. |
| Zinc, slab | 4.25c. to 4.50c. |
| Lead, American pig | 3.75c. to 4.00c. |
| Lead, bar | 7.25c. |
| Antimony, Asiatic | 8.50c. |
| Babbitt metal, medium grade | 16.50c. |
| Babbitt metal, high grade | 31.00c. |
| Solder, ½ and ¼ | 16.75c. |

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

| | Dealers' Buying Prices | Dealers' Selling Prices |
|-------------------------------------|------------------------|-------------------------|
| Copper, hvy. crucible | 3.75c. | 4.25c. |
| Copper, hvy. and wire | 3.50c. | 4.125c. |
| Copper, light and bottoms | 2.625c. | 3.375c. |
| Brass, heavy | 1.75c. | 2.25c. |
| Brass, light | 1.25c. | 1.75c. |
| Hvy. machine composition | 2.50c. | 3.125c. |
| No. 1 yel. brass turnings | 2.125c. | 2.50c. |
| No. 1 red brass or compos. turnings | 2.375c. | 3.00c. |
| Lead, heavy | 2.25c. | 2.50c. |
| Zinc | 1.25c. | 1.625c. |
| Cast aluminum | 3.75c. | 5.25c. |
| Sheet aluminum | 8.00c. | 9.75c. |

OBITUARY

KATE GLEASON, from 1890 to 1913 secretary and treasurer of the Gleason Works, Rochester, N. Y., died of pneumonia in that city on Jan. 9. She was born in Rochester on Nov. 25, 1865, the daughter of William Gleason, founder of the Gleason company. Having shown an early interest in machine shop practice, she went to Cornell University to study engineering. After a year at that institution she left to join her father's business. With the development of the automobile the demand for gears expanded rapidly and Miss Gleason took an active part in developing the gear end of the business. After her retirement from the active management of the Gleason Works, she became president of the National Bank of East Rochester, which post she held until 1919. Subsequently, much of her time was devoted to projects for civic betterment, in which connection she built a model community of more than 100 houses of standardized design erected by unskilled labor. Miss Gleason was the first woman to be a member of the American Society of Mechanical Engineers and of the Verein deutscher Ingenieure.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

| Soft Steel | Base per Lb. |
|----------------------|--------------|
| Fab. Pittsburgh mill | 1.60c. |
| Fab. Chicago | 1.70c. |
| Del'd Philadelphia | 1.91c. |
| Del'd New York | 1.95c. |
| Del'd Detroit | 1.95c. |
| Fab. Cleveland | 1.65c. |
| Fab. Lackawanna | 1.70c. |
| Fab. Birmingham | 1.75c. |
| C.I.F. Pacific ports | 2.10c. |

Billet Steel Reinforcing (as quoted by distributors)

| | |
|---------------------------------|--------|
| Fab. P'gh mills, 40, 50, 60-ft. | 1.50c. |
| Fab. Birmingham, mill lengths | 1.75c. |
| Fab. Cleveland | 1.50c. |

Rail Steel

| | |
|-----------------------------------|------------------|
| Fab. mills, east of Chicago dist. | 1.35c. to 1.45c. |
| Fab. Chicago Heights mills | 1.50c. |

Iron

| | |
|---------------------------------|--------|
| Common iron, f.o.b. Chicago | 1.60c. |
| Refined iron, f.o.b. P'gh mills | 2.75c. |
| Common iron, del'd Philadelphia | 1.86c. |
| Common iron, del'd New York | 1.90c. |

Tank Plates

| | Base per Lb. |
|----------------------------------|--------------|
| Fab. Pittsburgh mill | 1.60c. |
| Fab. Chicago | 1.70c. |
| Fab. Birmingham | 1.75c. |
| Del'd Cleveland | 1.8035c. |
| Del'd Philadelphia | 1.7935c. |
| Fab. Cantonville | 1.70c. |
| Fab. Sparrows Point | 1.70c. |
| Del'd New York | 1.898c. |
| C.I.F. Pacific ports | 2.00c. |
| Wrought iron plates, f.o.b. P'gh | 3.00c. |

Structural Shapes

| | Base per lb. |
|------------------------------------|--------------|
| Fab. Pittsburgh mill | 1.60c. |
| Fab. Chicago | 1.70c. |
| Fab. Birmingham | 1.75c. |
| Fab. Lackawanna | 1.70c. |
| Fab. Bethlehem | 1.70c. |
| Del'd Cleveland | 1.8035c. |
| Del'd Philadelphia | 1.7935c. |
| Del'd New York | 1.8675c. |
| C.I.F. Pacific ports (standard) | 2.10c. |
| C.I.F. Pacific ports (wide flange) | 2.20c. |

Steel Sheet Piling

| | Base per Lb. |
|---------------------------|--------------|
| F.o.b. Pittsburgh | 1.90c. |
| F.o.b. Chicago mill | 2.05c. |
| F.o.b. Buffalo | 2.00c. |

Alloy Steel Bars

| Alloy | Base per Lb. |
|---|--------------|
| Alloy Quantity Bar Base, 2.45c. to 2.65c. | per Lb. |
| S.A.E. Series | Differential |
| Numbers | per 100 Lbs. |
| 2000 (1% Nickel) | 0.25 |
| 2100 (1 1/4% Nickel) | 0.55 |
| 2300 (3/4% Nickel) | 1.50 |
| 2500 (5% Nickel) | 2.25 |
| 3100 Nickel Chromium | 0.55 |
| 3200 Nickel Chromium | 1.35 |
| 3300 Nickel Chromium | 0.90 |
| 3400 Nickel Chromium | 0.90 |
| 4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum) | 0.50 |
| 4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum) | 0.70 |
| 4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel) | 1.05 |
| 5100 Chromium Steel (0.60 to 0.90 Chromium) | 0.35 |
| 5100 Chromium Steel (0.90 to 1.10 Chromium) | 0.45 |
| 5100 Chromium Spring | 0.20 |
| 6100 Chromium Vanadium Bar | 1.20 |
| 6100 Chromium Vanadium Spring | 0.95 |
| 725 Silicon Manganese Spring | 0.25 |
| Steel (fats) | 0.50 |
| Rounds and Squares | 0.50 |
| Chromium Nickel Vanadium | 1.50 |
| Carbon Vanadium | 0.95 |

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is 1/4 c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross on is the net price for bars of the same analysis. Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2 1/2 in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars*

| | |
|-------------------------------|----------------------------|
| Bars, f.o.b. Pittsburgh mill | 1.70c. |
| Bars, f.o.b. Chicago | 1.75c. |
| Bars, Cleveland | 1.75c. |
| Bars, Buffalo | 1.75c. |
| Bars, Detroit | 1.90c. |
| Bars eastern Michigan | 1.95c. |
| Shafting, ground, f.o.b. mill | 1 1/4 in. 3.00c. |
| | 1-3/16 to 1 1/2 in. 2.50c. |
| | 1-9/16 to 1 3/4 in. 2.35c. |
| | 1-15/16 to 2 in. 2.20c. |
| | 2-1/16 to 2 1/2 in. 2.05c. |

* In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Hot-Rolled

| | |
|------------------------------------|------------------|
| No. 10, f.o.b. Pittsburgh | 1.45c. to 1.55c. |
| No. 10, f.o.b. Chicago mill | 1.55c. to 1.65c. |
| No. 10, del'd Philadelphia | 1.70c. to 1.80c. |
| No. 10, f.o.b. Birmingham | 1.60c. to 1.70c. |
| No. 10, c.i.f. Pacific Coast ports | 2.17 1/2 c. |

Hot-Rolled Annealed

| | |
|----------------------------------|------------------|
| No. 10, Pittsburgh | 1.60c. to 1.70c. |
| No. 10, Chicago mills | 1.70c. to 1.80c. |
| No. 10, Birmingham | 1.75c. to 1.80c. |
| No. 10, Pacific Coast ports | 2.32 1/2 c. |
| No. 10, wrought iron, Pittsburgh | 3.60c. |

Hot-Rolled Annealed

| | |
|------------------------------------|------------------|
| No. 24, f.o.b. Pittsburgh | 2.00c. to 2.10c. |
| No. 24, f.o.b. Ch'go mills | 2.10c. to 2.20c. |
| No. 24, del'd Philadelphia | 2.31c. to 2.41c. |
| No. 24, f.o.b. Birmingham | 2.25c. to 2.35c. |
| No. 24, c.i.f. Pacific Coast ports | 2.85c. |
| No. 24, wrought iron, Pittsburgh | 4.30c. |

Heavy Cold-Rolled

| | |
|------------------------------|--------|
| No. 10, f.o.b. Pittsburgh | 2.00c. |
| No. 10, f.o.b. Chicago mills | 2.10c. |
| No. 10, del'd Philadelphia | 2.41c. |

Light Cold-Rolled

| | |
|-----------------------------------|------------------|
| No. 20 gage, f.o.b. Pittsburgh | 2.40c. to 2.50c. |
| No. 20 gage, f.o.b. Chicago mills | 2.50c. to 2.60c. |
| No. 20 gage, del'd Philadelphia | 2.71c. to 2.81c. |

Note: Automobile body sheet and steel furniture sheets to be quoted henceforth on cold-rolled sheet base prices, with extras for drawing quality.

Galvanized Sheets

| | |
|------------------------------------|------------------|
| No. 24, f.o.b. Pittsburgh | 2.75c. to 2.85c. |
| No. 24, f.o.b. Ch'go mills | 2.85c. to 2.95c. |
| No. 24, del'd Philadelphia | 3.06c. to 3.16c. |
| No. 24, f.o.b. Birmingham | 2.90c. to 3.00c. |
| No. 24, c.i.f. Pacific Coast ports | 3.50c. |
| No. 24, wrought iron, Pittsburgh | 4.95c. |

Long Terns

| | |
|--|------------------|
| No. 24, unassorted, 8-lb. coating, f.o.b. Pittsburgh | 2.70c. to 2.80c. |
|--|------------------|

Vitreous Enameling Black

| | |
|---------------------------|------------------|
| No. 10, f.o.b. Pittsburgh | 2.50c. to 2.60c. |
| No. 20, f.o.b. Pittsburgh | 3.00c. to 3.10c. |

Tin Mill Black Plate

| | |
|---------------------------|------------------|
| No. 28, f.o.b. Pittsburgh | 2.30c. |
| No. 28, Chicago mill | 2.40c. to 2.50c. |

Tin Plate

| | Base per Box |
|---|--------------|
| Standard cokes, f.o.b. P'gh district mill | \$4.25 |
| Standard cokes, f.o.b. Gary | 4.35 |

Terne Plate

| Terne Plate | | | |
|-----------------------------------|---------|------|--------|
| (F.o.b. Morgantown or Pittsburgh) | | | |
| (Per Package, 20 x 28 in.) | | | |
| 8-lb. | coating | I.C. | \$9.50 |
| 15-lb. | coating | I.C. | 12.00 |
| 20-lb. | coating | I.C. | 13.00 |
| 25-lb. | coating | I.C. | 14.10 |
| 30-lb. | coating | I.C. | 14.90 |
| 40-lb. | coating | I.C. | 16.70 |

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.

| Plats under 1/4 in. | |
|-------------------------------------|------------------|
| | Base per lb. |
| All widths up to 24 in., Pittsburgh | 1.45c. |
| All widths up to 24 in., Chicago | 1.55c. |
| Cooperage stock, P'gh | 1.55c. to 1.60c. |
| Cooperage stock, Chicago | 1.65c. to 1.70c. |

Cold-Rolled Strips

| | |
|---|------------------|
| Fab. Pittsburgh | 1.90c. to 2.00c. |
| Fab. Cleveland | 1.90c. to 2.00c. |
| Del'd Chicago | 2.20c. to 2.30c. |
| Fab. Worcester | 2.20c. |
| Pender stock, No. 30, gage, Pittsburgh or Cleveland | 2.85c. to 2.75c. |

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)
(After Dec. 21, extras of 1lb. a 100 lb. on mixed and joint carloads, 25c. on pool carloads and 40c. on less than carloads will be applied on all merchant wire products.)

To Manufacturing Trade

| | |
|-------------|--------|
| Bright wire | 2.20c. |
| Spring wire | 3.20c. |

To Jobbing Trade

| | Base per Keg |
|-------------------------|------------------|
| Standard wire nails | \$1.95 |
| Smooth coated nails | 1.95 |
| Galvanized nails | 3.95 |
| | Base per lb. |
| Smooth annealed wire | 2.35c. |
| Smooth galvanized wire | 2.60c. |
| Polished staples | 2.50c. to 2.65c. |
| Galvanized staples | 2.75c. to 2.90c. |
| Barbed wire, galvanized | 2.60c. |

Woven wire fence No. 9 gage, per net ton

Woven wire fence, No. 12 1/2 gage and lighter, per net ton

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$1 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh

District and Lorain, Ohio, Mills

| District and Lorain, Ohio, Mills | | | |
|----------------------------------|--------|-------------|--------------|
| Hot Weld | | | |
| Inches | Steel | Black Galv. | Wrought Iron |
| 1/2 | 51 1/2 | 38 1/2 | 45 |
| 3/4 | 51 1/2 | 38 1/2 | 45 |
| 1 | 51 1/2 | 38 1/2 | 45 |
| 1 1/4 | 51 1/2 | 38 1/2 | 45 |
| 1 1/2 | 51 1/2 | 38 1/2 | 45 |
| 2 | 51 1/2 | 38 1/2 | 45 |
| 2 1/2 | 51 1/2 | 38 1/2 | 45 |
| 3 | 51 1/2 | 38 1/2 | 45 |
| 3 1/2 | 51 1/2 | 38 1/2 | 45 |
| 4 | 51 1/2 | 38 1/2 | 45 |
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| 5 | 51 1/2 | 38 1/2 | 45 |
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| 6 | 51 1/2 | 38 1/2 | 45 |
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| 7 | 51 1/2 | 38 1/2 | 45 |
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| 145 | 51 1/2 | | |

| Skelp | | |
|-----------------------------------|--|---------|
| (F.o.b. Pittsburgh or Youngstown) | | |
| | | Per Lb. |
| Grooved | | 1.60c. |
| Universal | | 1.60c. |
| Sheared | | 1.60c. |

| Wire Rods | | |
|---------------------|--|---------------|
| (Common soft, base) | | |
| | | Per Gross Ton |
| Pittsburgh | | \$37.00 |
| Cleveland | | \$7.00 |
| Chicago | | \$8.00 |

COKE, COAL AND FUEL OIL

| Coke | | |
|--|--|------------------|
| Furnace, f.o.b. Connellsville | | |
| | | Per Net Ton |
| Prompt | | \$1.75 to \$2.00 |
| Foundry, f.o.b. Connellsville | | 2.50 to 4.25 |
| Foundry, by-product, Chicago | | 7.00 |
| Foundry, by-product, delivered in Chicago switching district | | 7.75 |
| Foundry, by-product, New England, delivered | | 10.00 |
| Foundry, by-product, Newark or Jersey City, del'd. | | 8.30 to 8.81 |
| Foundry, by-product, Phila. | | 9.00 |
| Foundry, by-product, Cleveland, delivered | | 7.83 |
| Foundry, by-product, St. Louis, f.o.b. ovens | | 8.00 |
| Foundry, by-product, del'd St. Louis | | 9.00 |

| Coal | | |
|-------------------------------------|--|------------------|
| Mine run steam coal, f.o.b. | | |
| | | Per Net Ton |
| W. Pa. mines | | \$1.00 to \$1.15 |
| Mine run coking coal, f.o.b. W. Pa. | | 1.10 to 1.25 |
| Gas coal, 1/4-in., f.o.b. Pa. mines | | 1.25 to 1.40 |
| Mine run gas coal, f.o.b. Pa. mines | | 1.20 to 1.30 |
| Steam slack, f.o.b. W. Pa. mines | | 0.25 to 0.35 |
| Gas slack, f.o.b. W. Pa. mines | | 0.35 to 0.45 |

| Fuel Oil | | |
|--------------------------------|--|------------------|
| Per Gal. f.o.b. Bayonne, N. J. | | |
| | | |
| No. 2 distillate | | 4.00c. |
| No. 4 industrial | | 3.50c. |
| Per Gal. f.o.b. Baltimore | | |
| | | |
| No. 2 distillate | | 4.00c. |
| No. 4 industrial | | 3.50c. |
| Per Gal. del'd Chicago | | |
| | | |
| No. 2 industrial fuel oil | | 2.50c. to 2.90c. |
| No. 2 industrial fuel oil | | 2.45c. to 2.90c. |
| Per Gal. f.o.b. Cleveland | | |
| | | |
| No. 2 distillate | | 3.25c. |
| No. 4 industrial | | 2.75c. |

REFRACTORIES

| Fire Clay Brick | | |
|---------------------------|--|--------------------|
| Per 1000 f.o.b. Works | | |
| | | |
| Penn. ... | | \$25.00 to \$30.00 |
| Maryland | | 25.00 to 30.00 |
| New Jer. ... | | \$44.00 to \$7.00 |
| Ohio ... | | 35.00 to 30.00 |
| Kentucky | | 35.00 to 30.00 |
| Missouri ... | | 35.00 to 30.00 |
| Illinois | | 35.00 to 30.00 |
| Ground fire clay, per ton | | 6.50 |

| Chrome Brick | | |
|---------------|--|-------------|
| Standard size | | |
| | | Per Net Ton |
| | | \$43.50 |

| Silica Brick | | |
|-----------------------|--|--------------------|
| Per 1000 f.o.b. Works | | |
| | | |
| Pennsylvania | | \$39.00 |
| Chicago | | \$35.00 to \$36.00 |
| Birmingham | | \$47.00 |
| Alta clay, per ton | | 8.00 |

| Magnesite Brick | | |
|--|--|-------------|
| Standard sizes, burned, f.o.b. Bailmore and Chester, Pa. | | |
| | | Per Net Ton |
| Unburned, f.o.b. Baltimore | | \$31.50 |
| Grain magnesite, f.o.b. Baltimore and Chester, Pa. | | 33.50 |
| Domestic, f.o.b. Chewelah, Wash. | | 30.90 |

| CAST IRON PIPE | | |
|----------------------------------|--|--------------------|
| Per Net Ton | | |
| | | |
| 6-in. and larger, del'd Chicago | | \$40.40 to \$41.40 |
| 4-in., del'd Chicago | | 43.40 to 44.40 |
| 6-in. and larger, del'd New York | | 35.30 |
| 6-in., del'd New York | | 38.30 |
| 6-in. and larger, Birm'ham | | 33.00 |
| 4-in., Birm'ham | | 36.00 |

Pig Iron, Ores, Ferroalloys

| VALLEY | | |
|---------------------------------------|--|------------------|
| Per Gross ton, f.o.b. Valley furnace: | | |
| | | |
| Basic | | \$13.50 |
| Bessemer | | 15.00 |
| Gray Forge | | 14.50 |
| No. 2 foundry | | 14.50 |
| No. 3 foundry | | 14.00 |
| Malleable | | \$14.50 to 15.00 |
| Low phos., copper free | | 23.00 to 25.00 |

Freight rate to Pittsburgh or Cleveland district, \$1.50.

| PITTSBURGH | | |
|--|--|---------|
| Per Gross ton, f.o.b. Pittsburgh district furnace: | | |
| | | |
| Basic | | \$14.00 |
| No. 2 foundry | | 15.00 |
| No. 3 foundry | | 14.50 |
| Malleable | | 15.00 |
| Bessemer | | 15.00 |

Freight rates to points in Pittsburgh district range from 50c. to \$1.20.

| CHICAGO | | |
|--|--|---------|
| Per gross ton at Chicago furnace: | | |
| | | |
| N'th'n No. 1 fdy. | | \$15.50 |
| N'th'n No. 2 fdy. | | 16.00 |
| Malleable, not over 2.50 sil. | | 15.50 |
| High phosphorus | | 15.50 |
| Lake Super. charcoal, sil. 1.50, by rail | | 23.17 |
| Southern No. 2 fdy. | | 16.14 |
| Low phos., sil. 1 to 2, Copper free | | 25.00 |
| Silver, sil. 8 per cent. | | 23.87 |
| Bess. ferro-sil'n, 15 per cent. | | 28.92 |

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

| ST. LOUIS | | |
|--|--|----------------|
| Per gross ton at St. Louis: | | |
| | | |
| No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill. | | \$17.50 |
| Malleable, f.o.b. Granite City | | 17.50 |
| Northern No. 2 fdy., del'd | | 18.80 |
| Southern No. 2 fdy., del'd | | 14.56 |
| Northern malleable, del'd | | 18.80 to 18.90 |
| Northern basic, del'd | | 18.80 to 18.90 |

Freight rates \$5c. (average) Granite City to St. Louis; \$2.30 from Chicago; \$4.50 from Birmingham.

| NEW YORK | | |
|---|--|--------------------|
| Per gross ton, delivered New York district: | | |
| | | |
| * Buffalo, No. 2, del'd east | | \$17.41 to \$17.60 |
| East Pa. No. 2 fdy. | | 14.02 |
| East Pa. No. 3 fdy. | | 14.52 |

Freight rates: \$1.53 to \$3.63 from eastern Pennsylvania.
* Prices delivered to New Jersey cities having rate of \$3.41 a ton from Buffalo.

| BUFFALO | | |
|--------------------------------|--|---------|
| Per gross ton, f.o.b. furnace: | | |
| | | |
| No. 2 fdy. | | \$16.00 |
| No. 2X fdy. | | 16.50 |
| No. 1 fdy. | | 17.50 |
| Malleable, sil. up to 2.25 | | 16.50 |
| Basic | | 15.50 |
| Lake Superior charcoal, del'd | | 23.41 |

| NEW ENGLAND | | |
|---|--|---------|
| Per gross ton delivered to most New England points: | | |
| | | |
| * Buffalo, sil. 1.75 to 2.25 | | \$19.05 |
| * Buffalo, sil. 2.25 to 2.75 | | 19.05 |
| * Buffalo, sil. 1.75 to 2.25 | | 17.41 |
| * Buffalo, sil. 2.25 to 2.75 | | 17.41 |
| * Ala., sil. 1.75 to 2.25 | | 18.64 |
| * Ala., sil. 2.25 to 2.75 | | 16.14 |

Freight rates: \$5.05 all rail from Buffalo, and \$3.41 to \$3.91 rail and water from Buffalo when 1 barge and \$2 to \$2.50 New England freight rate are obtainable; \$3.54 rail and water from Alabama to New England seaboard.
* All-rail rate.

| CINCINNATI | | |
|--------------------------------------|--|------------------|
| Per gross ton, delivered Cincinnati: | | |
| | | |
| Ala. fdy., sil. 1.75 to 2.25 | | \$13.83 |
| Ala. fdy., sil. 2.25 to 2.75 | | 14.32 |
| Tenn. fdy., sil. 1.75 to 2.25 | | 13.92 |
| N'th'n No. 3 foundry | | \$17.01 to 17.50 |
| W'th'n Ohio silvery, 8% | | 21.02 |

Freight rates, \$2.02 from Ironton and Jackson, Ohio; \$2.52 from Birmingham.

| CLEVELAND | | |
|-------------------------------------|--|---------|
| Per gross ton at Cleveland furnace: | | |
| | | |
| N'th'n No. 2 fdy. (local delivery) | | \$15.00 |
| W'th'n fdy., sil. 1.75 to 2.25 | | 16.14 |
| Malleable (local delivery) | | 15.00 |
| Ohio silvery, 8 per cent. | | 21.87 |
| Stand. low phos., Valley | | 23.00 |

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 63c. average local switching charge; \$3.12 from Jackson, Ohio; \$3.14 from Birmingham.

| PHILADELPHIA | | |
|---|--|--------------------|
| Per gross ton at Philadelphia: | | |
| | | |
| East. Pa. No. 2 | | \$13.34 to \$13.84 |
| East. Pa. No. 2X | | 13.84 to 14.34 |
| East. Pa. No. 1X | | 14.34 to 14.84 |
| Basic (del'd east. Pa.) | | 13.50 to 14.00 |
| Malleable | | 14.74 to 15.04 |
| Stand. low phos. (f.o.b. east. Pa. furnace) | | 20.00 to 21.00 |
| Cop. b'r'g low phos. (f.o.b. furnace) | | 20.00 to 21.00 |
| Va. No. 2 | | 21.79 |
| Va. No. 2X | | 22.29 |

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates: 84c. to \$1.79 from eastern Pennsylvania furnaces; \$4.67 from Virginia furnaces.

| BIRMINGHAM | | |
|---|--|---------|
| Per gross ton, f.o.b. Birmingham dist. furnace: | | |
| | | |
| No. 2 fdy., 1.75 to 2.25 sil. | | \$11.00 |
| No. 2 soft, 2.25 to 2.75 sil. | | 11.50 |
| Basic | | 11.00 |

| CANADA | | |
|-------------------------------|--|------------------|
| Per gross ton: | | |
| | | |
| Delivered Toronto | | \$22.60 |
| No. 2 fdy., sil. 2.25 to 2.75 | | 22.10 |
| Malleable | | 22.60 |
| Delivered Montreal | | \$24.00 |
| No. 2 fdy., sil. 1.75 to 2.25 | | 23.50 |
| Malleable | | 24.00 |
| Basic | | \$23.00 to 23.50 |

| Ferromanganese | | |
|--|--|---------|
| Per Gross Ton | | |
| | | |
| Domestic, 80%, seaboard | | \$68.00 |
| Foreign, 80%, Atlantic or Gulf port, duty paid | | 65.00 |

Prices for lots of one carload or more; extras applied on less than carload lots.

| Electric Ferrosilicon | | |
|--|--|---------|
| Per Gross Ton Delivered | | |
| | | |
| 40% (carloads) | | \$74.50 |
| 50% (less carloads) | | 82.00 |
| 75% (less carloads) | | 120.00 |
| 14% to 16% (f.o.b.) Welland, Ont., in carloads | | \$1.00 |
| 14% to 16% (less carloads) | | 36.00 |

| Bessemer Ferroalloy | | |
|--------------------------------------|---------|-----|
| F.o.b. Jackson County, Ohio, Furnace | | |
| | | |
| 10% | \$30.50 | 14% |
| 11% | 31.00 | 15% |
| 12% | 31.50 | 16% |
| 13% | 32.50 | 17% |

| Silvery Iron | | |
|--------------------------------------|---------|-----|
| F.o.b. Jackson County, Ohio, Furnace | | |
| | | |
| 6% | \$18.00 | 13% |
| 7% | 18.50 | 14% |
| 8% | 18.75 | 15% |
| 9% | 19.00 | 16% |
| 10% | 19.50 | 17% |
| 11% | 20.00 | 18% |

Other Ferroalloys
Ferrotungsten, per lb. wa. del., carloads \$94c.

| PITTSBURGH | | |
|---|--|------------------|
| Per gross ton delivered consumers' yards: | | |
| | | |
| No. 1 heavy melting steel | | \$8.00 to \$9.00 |
| No. 2 heavy melting steel | | 7.00 to 7.50 |
| No. 2 railroad wrought | | 8.00 to 8.50 |
| Scrap rails | | 8.00 to 8.50 |
| Rails 3 ft. and under | | 10.00 to 10.50 |
| Sheet bar crops, ordinary | | 9.00 to 9.50 |
| Compressed sheet steel | | 8.00 to 8.50 |
| Hand bundled sheet steel | | 7.00 to 7.50 |
| Hvy. steel axle turnings | | 7.00 to 7.50 |
| Machine shop turnings | | 6.25 to 6.75 |
| Short shot, steel turnings | | 6.25 to 6.75 |
| Short mixed borings and turnings | | 5.50 to 6.00 |
| Cast iron borings | | 5.50 to 6.00 |
| Cast iron car wheels | | 8.00 to 8.50 |
| Heavy breakable cast | | 8.00 to 8.50 |
| No. 1 cast | | 8.50 to 9.50 |
| Rail, knuckles and couplers | | 9.50 to 10.00 |
| Rail, coil and leaf springs | | 9.50 to 10.00 |
| Rolled steel wheels | | 9.50 to 10.00 |
| Low phos. billet crops | | 11.00 to 11.50 |
| Low phos. plate crops | | 11.00 to 11.50 |
| Low phos. punchings | | 10.50 to 11.00 |
| Steel car axles | | 11.00 to 11.50 |

Delivered Chicago district consumers:

| CHICAGO | | |
|---------------------|--|------------------|
| Per Gross Ton | | |
| | | |
| Heavy melting steel | | \$5.00 to \$5.50 |
| Shoveling steel | | 5.00 to 5.50 |

| | | |
|---|--|--------------------|
| Ferrotungsten, less carloads | | \$1.90 |
| Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads | | 9.50c. |
| Ferrocromium, 2% carbon | | 16.50c. to 17.00c. |
| Ferrocromium, 1% carbon | | 17.50c. to 18.00c. |
| Ferrocromium, 0.10% carbon | | 19.50c. to 20.00c. |
| Ferrocromium, 0.06% carbon | | 20.00c. to 20.50c. |
| Ferrocromium, del. per lb. contained Va. | | \$2.00 to \$2.50 |
| Ferrocromium, 15 to 16%, per net ton, f.o.b. furnace in carloads | | 109.00 |
| Ferrophosphorus, electric, or blast furnace material, in carloads, 18% Rockdale, Tenn., base per gross ton with \$2 unitage | | 50.00 |
| Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage | | 65.00 |
| Ferromolybdenum, per lb. Mo., del. 90c. | | |
| Calcium molybdate, per lb. Mo., del. | | 80c. |
| Silico spiegel, per ton, f.o.b. furnace, car lots | | \$34.00 |
| Ton lots or less, per ton | | 41.00 |
| Silico-manganese, gross ton, delivered: | | |
| 2.50% carbon grade | | 25.00 |
| 2% carbon grade | | 30.00 |
| 1% carbon grade | | 100.00 |
| Spot prices | | \$5 a ton higher |

Ores

| Lake Superior Ores, Delivered Lower Lake Ports | | |
|---|--|---------------------|
| | | Per Gross Ton |
| Old range Bessemer | | \$1.50% iron \$4.25 |
| Old range, non-Bessemer | | 51.50% |
| Mesabi Bessemer | | \$1.50% iron 4.50 |
| Mesabi non-Bessemer | | \$1.50% iron 4.50 |
| High phosphorus | | \$1.50% iron 4.40 |
| Foreign Ore, c.i.f. Philadelphia or Baltimore | | |
| Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian | | \$c. to \$1.00 |
| Iron, low phos., Swedish, average 63% iron | | 9c. |
| Iron, low phos., Swedish, average 65% iron | | 9c. |
| Iron, basic or foundry, Russian, aver. 62% iron (nom.) | | 9c. |
| Manganese, Caucasian, washed 52% | | 22c. |
| Manganese, African, Indian, 50-52% | | 21c. to 22c. |
| Manganese, Brazilian, 48 to 49% | | 19c. |
| Tungsten, Chinese wolframite, duty paid | | \$10.00 |
| Tungsten, domestic scheelite | | \$5.00 to \$14.00 |
| Chromite, 45%, Cr2O3, crude, c.i.f. Atlantic seaboard | | 16.00 |
| Chromite, 45%, Cr2O3, c.i.f. Atlantic seaboard | | 15.00 |

| | |
|-------------------------------|------------------|
| No. 2 bushelings..... | \$2.00 to \$2.50 |
| Locomotive tires, smooth..... | 7.50 to 8.50 |
| Pipe and flues..... | 1.25 to 1.75 |
| No. 1 machinery cast..... | 6.25 to 6.75 |
| Clean automobile cast..... | 7.25 to 7.75 |
| No. 1 railroad cast..... | 5.25 to 5.75 |
| No. 1 agricultural cast..... | 5.75 to 6.25 |
| Store plate..... | 5.50 to 6.00 |
| Grate bars..... | 6.25 to 6.75 |
| Brake shoes..... | 5.75 to 6.25 |

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

| | |
|---|------------------|
| Per gross ton delivered consumers' yards: | |
| No. 1 heavy melting steel..... | \$6.50 to \$7.00 |
| No. 2 heavy melting steel..... | 5.00 to 5.50 |
| No. 1 railroad wrought..... | 7.50 to 8.00 |
| Bundled sheets..... | 4.00 to 4.50 |
| Hydraulic compressed, new..... | 5.50 to 6.00 |
| Hydraulic compressed, old..... | 4.00 to 4.50 |
| Machine shop turnings..... | 3.50 to 4.00 |
| Heavy axle turnings..... | 5.50 to 6.00 |
| Cast borings..... | 3.50 to 3.75 |
| Heavy breakable cast..... | 8.50 |
| Store plate (steel works)..... | 6.00 to 6.50 |
| No. 1 low phosph. heavy..... | 10.00 to 10.50 |
| Couplers and knuckles..... | 8.00 to 8.50 |
| Boiled steel wheels..... | 8.00 to 8.50 |
| No. 1 blast furnace..... | 3.50 to 3.75 |
| Spec. iron and steel pipe..... | 6.50 to 7.00 |
| Shafing..... | 12.00 to 13.00 |
| Steel axles..... | 12.00 to 13.00 |
| No. 1 force fire..... | 8.50 to 9.00 |
| Cast iron car wheels..... | 8.00 to 8.50 |
| Cast iron..... | 8.00 to 9.00 |
| Cast borings (chem.)..... | 8.00 to 10.00 |
| Steel rails for rolling..... | 9.00 to 9.50 |

CLEVELAND

| | |
|---|------------------|
| Per gross ton delivered consumers' yards: | |
| No. 1 heavy melting steel..... | \$7.00 to \$7.25 |
| No. 2 heavy melting steel..... | 6.25 to 6.50 |
| Compressed sheet steel..... | 6.00 to 6.50 |
| Light bundled sheet stamp..... | 4.00 to 4.50 |
| Drop forge flashings..... | 5.25 to 5.75 |
| Machine shop turnings..... | 3.25 to 3.50 |
| Short shoveling turnings..... | 4.00 to 4.50 |
| No. 1 busheling..... | 5.25 to 5.50 |
| Steel axle turnings..... | 5.00 to 5.50 |
| Low phosph. billet crops..... | 10.00 to 11.00 |
| Cast iron borings..... | 3.75 to 4.00 |
| Mixed borings and short turnings..... | 3.75 to 4.00 |
| No. 2 busheling..... | 3.75 to 4.00 |
| No. 1 cast..... | 5.00 to 5.50 |
| Railroad grate bars..... | 5.00 to 5.50 |
| Store plate..... | 5.00 to 5.50 |
| Rails under 8 ft..... | 8.50 to 9.00 |
| Rails for rolling..... | 8.50 to 9.00 |
| Railroad malleable..... | 6.75 to 7.00 |
| Cast iron car wheels..... | 8.00 |

BUFFALO

| | |
|---|----------------|
| Per gross ton, f.o.b. Buffalo consumers' yards: | |
| No. 1 heavy melting steel..... | \$7.25 |
| No. 2 heavy melting steel..... | \$6.00 to 6.50 |
| Scrap rails..... | 6.00 to 6.50 |
| New hydraulic comp. sheets..... | 6.00 to 6.50 |
| Old hydraulic comp. sheets..... | 5.00 |
| Drop forge flashings..... | 6.00 to 6.50 |
| No. 1 busheling..... | 6.00 to 6.50 |
| Hy. steel axle turnings..... | 6.00 |
| Machine shop turnings..... | 4.00 to 4.50 |
| Knuckles and couplers..... | 9.00 |
| Coil and leaf springs..... | 9.00 |
| Boiled steel wheels..... | 9.00 |
| Low phosph. billet crops..... | 9.00 to 9.50 |
| Short shov. steel turnings..... | 5.50 to 6.00 |
| Short mixed borings and turnings..... | 3.75 to 4.25 |
| Cast iron borings..... | 3.75 to 4.25 |
| No. 2 busheling..... | 3.50 to 4.00 |
| Steel car axles..... | 10.00 to 11.00 |
| from axles..... | 10.00 to 11.00 |
| No. 1 machinery cast..... | 9.50 to 10.00 |
| No. 1 cupola cast..... | 8.50 to 9.00 |
| Store plate..... | 6.50 to 7.00 |
| Steel rails, 3 ft. and under..... | 9.25 to 9.75 |
| Cast iron car wheels..... | 8.00 to 9.00 |
| Industrial malleable..... | 7.00 to 7.50 |
| Railroad malleable..... | 7.00 to 7.50 |
| Chemical borings..... | 7.50 to 8.00 |

BIRMINGHAM

| | |
|---|------------------|
| Per gross ton delivered consumers' yards: | |
| Heavy melting steel..... | \$7.50 to \$8.00 |
| Scrap steel rails..... | 8.00 to 8.50 |
| Short shoveling turnings..... | 4.00 |
| Store plate..... | 6.00 |
| Steel axles..... | 9.00 |
| Iron axles..... | 9.00 |
| No. 1 railroad wrought..... | 4.50 to 5.00 |
| Rails for rolling..... | 8.00 to 8.50 |
| No. 1 cast..... | 8.50 |
| Tramcar wheels..... | 8.50 |
| Cast iron borings, chem..... | 8.50 |

ST. LOUIS

| | |
|---|------------------|
| Per gross ton delivered consumers' yards: | |
| Selected heavy steel..... | \$5.50 to \$6.00 |
| No. 1 heavy melting..... | 5.00 to 5.50 |
| No. 2 heavy melting..... | 4.75 to 5.25 |
| No. 1 locomotive tire..... | 5.00 to 5.50 |
| Misc. stand-sew. rails..... | 5.25 to 5.75 |
| Railroad springs..... | 6.00 to 6.50 |
| Bundled sheets..... | 2.00 to 2.50 |
| No. 2 railroad wrought..... | 5.00 to 5.50 |
| No. 1 busheling..... | 3.50 to 4.00 |
| Cast iron borings and shoveling turnings..... | 2.75 to 3.25 |
| Iron rails..... | 7.00 to 7.50 |
| Rails for rolling..... | 6.75 to 7.25 |
| Machine shop turnings..... | 2.00 to 2.50 |
| Heavy turnings..... | 3.00 to 3.50 |
| Steel car axles..... | 8.50 to 9.00 |
| Iron car axles..... | 11.00 to 11.50 |
| Wrot. iron bars and trans..... | 4.00 to 4.50 |
| No. 1 railroad wrought..... | 3.50 to 4.00 |
| Steel rails less than 3 ft..... | 7.00 to 7.50 |
| Steel angle bars..... | 6.00 to 6.50 |

| | |
|------------------------------------|------------------|
| Cast iron car wheels..... | \$5.00 to \$5.50 |
| No. 1 machinery cast..... | 6.50 to 7.00 |
| Railroad malleable..... | 4.00 to 4.50 |
| No. 1 railroad cast..... | 6.25 to 6.75 |
| Store plate..... | 6.00 to 6.50 |
| Relay, rails, 60 lb. and over..... | 16.00 to 16.50 |
| Relay, rails, 60 lb. and over..... | 20.00 to 21.00 |
| Agricult. malleable..... | 4.00 to 4.50 |

NEW YORK

| | |
|---------------------------------------|------------------|
| Dealers' buying prices per gross ton: | |
| No. 1 heavy melting steel..... | \$3.50 to \$4.50 |
| No. 2 heavy melting steel..... | 3.00 to 3.50 |
| Heavy melting steel (yard)..... | 1.50 |
| No. 1 hvy. breakable cast..... | 5.00 to 5.25 |
| Store plate (steel works)..... | 2.50 to 2.90 |
| Machine shop turnings..... | 0.75 to 1.25 |
| Short shoveling turnings..... | 0.75 to 1.25 |
| Cast borings..... | 0.50 to 1.00 |
| No. 1 blast furnace..... | 0.50 to 1.00 |
| Steel car axles..... | 8.00 to 8.50 |
| Spec. iron and steel pipe..... | 2.50 to 2.75 |
| Forge fire..... | 2.75 to 3.00 |
| No. 1 railroad wrought..... | 4.00 to 4.50 |
| No. 2 yard wrought long..... | 4.00 to 4.50 |
| Rails for rolling..... | 5.00 to 5.50 |
| No. 1 cast..... | 4.50 |
| No. 2 cast..... | 4.50 |
| Store plate (foundry)..... | 4.50 |
| Malleable cast (railroad)..... | 4.00 to 4.50 |
| Cast borings (chemical)..... | 6.00 to 6.50 |

| | |
|---|--------------|
| Per gross ton, delivered local foundries: | |
| No. 1 machinery cast..... | \$9.00 |
| No. 1 hvy. cast (cupola size)..... | 7.50 to 8.00 |
| No. 2 cast..... | 4.00 to 4.50 |

PITTSBURGH

| | |
|--|-----------------------|
| Base per lb. | |
| Plates..... | 2.85c |
| Structural shapes..... | 2.85c |
| Soft steel bars and small shapes..... | 2.60c |
| Reinforcing steel bars..... | 2.60c |
| Cold-finished and screw stock..... | 2.60c |
| Rounds and hexagons..... | 2.95c |
| Squares and flats..... | 3.45c |
| Hoops and bands, under 1/4 in..... | 2.95c |
| Hot-rolled annealed sheets (No. 24)..... | 3.15c |
| 25 or more bundles..... | 3.15c |
| Galv. sheets (No. 24), 25 or more bundles..... | 3.65c |
| Hot-rolled sheets (No. 10)..... | 3.10c |
| Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)..... | \$3.74 |
| Spikes, large..... | 2.40c |
| Small..... | 2.55c |
| Boat..... | 2.90c |
| Track bolts, all sizes, per 100 count..... | 70 per cent off list. |
| Machine bolts, 100 count..... | 70 per cent off list. |
| Carriage bolts, 100 count..... | 70 per cent off list. |
| Nuts, all styles, 100 count..... | 70 per cent off list. |
| Large rivets, base per 100 lb..... | \$3.08 |
| Wire, black, soft ann'd, base per 100 lb..... | 2.75 |
| Wire, galv. soft, base per 100 lb..... | 3.20 |
| Common wire nails, per keg..... | 2.35 |
| Cement coated nails, per keg..... | 2.35 |
| On plates, structural, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb. | |

CHICAGO

| | |
|---|-----------------|
| Base per lb. | |
| Plates and structural shapes..... | 3.00c |
| Soft steel bars..... | 2.75c |
| Reinforc. bars, billet steel..... | 1.40c |
| Rail steel reinforcement..... | 1.15c to 1.25c |
| Cold-fn. steel bars and shafting..... | 3.00c |
| Rounds and hexagons..... | 3.00c |
| Flats and squares..... | 3.50c |
| Bands, 3/16 in. (in. Nos. 10 and 12 gages)..... | 2.95c |
| Hoops (No. 14 gage and lighter)..... | 3.50c |
| Hot-rolled annealed sheets (No. 24)..... | 3.45c |
| Galv. sheets (No. 24)..... | 3.75c |
| Hot-rolled sheets (No. 10)..... | 2.75c |
| Spikes (3/16 in. and lighter)..... | 2.45c |
| Track bolts..... | 4.30c |
| Rivets, structural..... | 3.75c |
| Rivets, boiler..... | 3.75c |
| Per Cent Off List | |
| Machine bolts..... | 65 |
| Carriage bolts..... | 65 |
| Coach and lag screws..... | 65 |
| Hot-pressed nuts, sq. tap. or blank..... | 65 |
| Hot-pressed nuts, hex. tap. or blank..... | 65 |
| Hex. head cap screws..... | 80 and 10 |
| Cup point set screws..... | 75 and 10 |
| Spring cotters..... | 60 |
| Store bolts..... | 80 |
| Rd. hd. tank rivets, 7/16 in. and smaller..... | 65 |
| Wrought washers..... | \$4.50 off list |
| No. 8 black ann'd wire, per 100 lb..... | \$3.45 |
| Com. wire nails, base per keg..... | 2.30 |
| Cement c'd nails, base per keg..... | 2.30 |

NEW YORK

| | |
|---|----------------|
| Base per lb. | |
| Plates and struc. shapes..... | 3.10c |
| Soft steel bars, small shapes..... | 3.10c |
| Iron bars, Swed. charcoal..... | 6.00c to 6.50c |
| Cold-fn. shafting and screw stock..... | 3.54c |
| Rounds and hexagons..... | 3.54c |
| Flats and squares..... | 4.04c |
| Cold-rol. strip, soft and quarter hard..... | 4.95c |
| Hoops..... | 3.30c |
| Bands..... | 3.30c |
| Hot-rolled sheets (No. 10)..... | 3.00c |
| Hot-rolled ann'd sheets (No. 24)..... | 3.50c |
| Galvanized sheets (No. 24)..... | 4.00c |
| Long term sheets (No. 24)..... | 4.00c |
| Standard hot steel..... | 3.00c |
| Wire, black annealed (No. 10)..... | 3.60c |
| Wire, galv. annealed (No. 10)..... | 4.05c |
| Tire steel 1/4 x 1/4 in. and larger..... | 3.40c |
| Smooth finish, 1 to 2 1/4 x 1/4 in. and larger..... | 3.75c |

BOSTON

| | |
|---|------------------|
| Dealers' buying prices per gross ton: | |
| No. 1 heavy melting steel..... | \$3.00 to \$3.25 |
| Scrap F rails..... | 2.50 to 2.75 |
| Machine shop turnings..... | 0.80 to 1.00 |
| Cast iron borings..... | 1.00 to 1.25 |
| Bundled skeleton, long..... | 2.00 to 2.10 |
| Forge flashings..... | 3.00 to 3.50 |
| Blast furnace scrap..... | 0.90 to 1.00 |
| Forge scrap..... | 3.00 to 3.25 |
| Shafing..... | 3.50 to 10.00 |
| Steel car axles..... | 9.00 to 9.50 |
| Wrought pipe..... | 4.00 to 4.25 |
| Rails for rolling..... | 4.50 to 5.00 |
| Cast iron borings, chemical..... | 7.00 to 7.25 |
| Per gross ton delivered consumers' yards: | |
| Textile cast..... | \$7.00 to \$7.50 |
| No. 1 machinery cast..... | 7.50 to 8.00 |
| Store plate..... | 5.00 to 5.25 |
| Railroad malleable..... | 8.00 to 8.50 |

CINCINNATI

| | |
|---------------------------------------|------------------|
| Dealers' buying prices per gross ton: | |
| Heavy melting steel..... | \$5.00 to \$5.50 |
| Scrap rails for melting..... | 6.00 to 6.50 |
| Lame sheet clippings..... | 1.00 to 1.50 |
| Bundled sheets..... | 3.75 to 4.25 |
| Cast iron borings..... | 3.00 to 3.50 |
| Machine shop turnings..... | 3.00 to 3.50 |
| No. 1 busheling..... | 4.50 to 5.00 |
| No. 2 busheling..... | 2.75 to 3.25 |
| Rails for rolling..... | 6.50 to 7.00 |
| No. 1 locomotive tires..... | 7.00 to 7.50 |
| Short rails..... | 9.00 to 9.50 |
| Cast iron car wheels..... | 8.50 to 9.00 |
| No. 1 machinery cast..... | 8.25 to 8.75 |
| No. 1 railroad cast..... | 7.75 to 8.25 |

ST. LOUIS

| | |
|---|-------------------|
| Base per lb. | |
| Open-hearth spring steel, bases..... | 4.50c to 7.00c |
| Common wire nails, base, per keg..... | Off List |
| Machine bolts, cut thread: | |
| 1/2 x 6 in. and smaller..... | .65 to .65 and 10 |
| 1 x 30 in. and smaller..... | .65 to .65 and 10 |
| Carriage bolts, cut thread: | |
| 1/2 x 6 in. and smaller..... | .65 to .65 and 10 |
| 1 x 30 in. and smaller..... | .65 to .65 and 10 |
| Boiler Tubes: | |
| Lap welded, 2-in..... | \$18.05 |
| Seamless welded, 2-in..... | 19.24 |
| Charcoal iron, 2-in..... | 24.94 |
| Charcoal iron, 4-in..... | 63.65 |
| *No. 28 and lighter, 3/8 in. wide, 20c higher per 100 lb. | |

PHILADELPHIA

| | |
|--|-------|
| Base per lb. | |
| Plates and struc. shapes..... | 3.25c |
| Soft steel or iron..... | 3.00c |
| Cold-fn. rounds, shafting, screw stock..... | 2.36c |
| Hot-rolled annealed sheets (No. 24)..... | 3.70c |
| Galv. sheets (No. 24)..... | 4.00c |
| Hot-rolled sheets (No. 10) up to and inc. 48 in. wide..... | 3.00c |
| over 48 in. wide..... | 3.15c |
| Black corrug. sheets (No. 24)..... | 3.75c |
| Gal. corrug. sheets..... | 4.05c |
| Structural rivets..... | 4.00c |
| Boiler rivets..... | 4.00c |
| Per Cent Off List | |
| Tank rivets, 7/16 in. and smaller..... | 65 |
| Less than 100 lb..... | 60 |
| Machine bolts..... | 65 |
| Carriage bolts..... | 65 |
| Lag screws..... | 65 |
| Hot-pressed nuts, sq. blank or tapped, 200 lb. or more..... | 65 |
| Less than 200 lb..... | 55 |
| Hot-pressed nuts, hex. blank or tapped, 200 lb. or more..... | 65 |
| Less than 200 lb..... | 55 |

PHILADELPHIA

| | |
|---|-------|
| Base per lb. | |
| *Plates, 1/4-in. and heavier..... | 2.45c |
| *Structural shapes..... | 2.45c |
| *Soft steel bars, small shapes, iron bars (except bands)..... | 2.45c |
| Reinforc. steel bars, sq., twisted and deformed..... | 2.95c |
| Cold-fn. steel, rounds and hex..... | 3.35c |
| Cold-fn. flats and sq..... | 3.85c |
| *Steel hoops..... | 3.00c |
| *Steel bands, No. 12 to 3/16 in. incl..... | 2.75c |
| Spring steel..... | 5.00c |
| Hot-rolled annealed sheets (No. 24)..... | 3.55c |
| Galvanized sheets (No. 24)..... | 3.75c |
| *Hot-rolled annealed sheets (No. 10)..... | 2.90c |
| Diam. pat. floor plates, 1/4 in..... | 5.00c |
| Swedish iron bars..... | 5.60c |

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.
*Base prices subject to deductions on orders aggregating 4000 lb. or over.

CLEVELAND

| | |
|--|----------------|
| Base per lb. | |
| Plates and struc. shapes..... | 2.95c |
| Soft steel bars..... | 2.75c |
| Reinforc. steel bars..... | 1.75c to 1.95c |
| Cold-fn. rounds and hex..... | 2.95c |
| Cold-fn. flats and sq..... | 3.00c |
| Flat rolled steel under 1/4 in..... | 3.00c |
| Cold-finished strip..... | 5.55c |
| Hot-rolled annealed sheets (No. 24)..... | 3.25c |
| Galvanized sheets (No. 10)..... | 3.00c |
| Black ann'd wire, per 100 lb..... | \$2.75 |
| No. 9 galv. wire, per 100 lb..... | 3.20 |
| Com. wire nails, base per keg..... | 2.35 |

*Net base, including boxing and cutting to length.

CINCINNATI

| | |
|-------------------------------|-------|
| Base per lb. | |
| Plates and struc. shapes..... | 3.35c |
| Bars, soft steel or iron..... | 2.00c |
| New billet reforc. bars..... | 3.00c |
| Rails steel reforc. bars..... | 3.00c |

| | |
|-----------------------------|------------------|
| Burnt cast..... | \$4.25 to \$4.75 |
| Store plate..... | 4.25 to 4.75 |
| Agricultural malleable..... | 6.75 to 7.25 |
| Railroad malleable..... | 7.00 to 7.50 |

DETROIT

| | |
|---------------------------------------|------------------|
| Dealers' buying prices per gross ton: | |
| Hvy. melting steel..... | \$4.50 to \$5.00 |
| Borings and short turnings..... | 2.00 to 2.50 |
| Long turnings..... | 1.50 to 2.00 |
| No. 1 machinery cast..... | 7.75 to 8.25 |
| Automotive cast..... | 8.00 to 8.50 |
| Hydraulic comp. sheets..... | 4.00 to 4.50 |
| Store plate..... | 3.00 to 3.50 |
| New No. 1 busheling..... | 3.50 to 4.00 |
| Old No. 2 busheling..... | 1.50 to 2.00 |
| Sheet clippings..... | 1.25 to 1.75 |
| Flashings..... | 3.75 to 4.25 |

CANADA

| | |
|---------------------------------------|---------------|
| Dealers' buying prices per gross ton: | |
| Toronto Montreal | |
| Heavy melting steel..... | \$7.00 \$6.00 |
| Rails scrap..... | 7.00 6.00 |
| No. 1 wrought..... | 6. |

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Jacob Ruppert Corp., 1639 Third Avenue, New York, has plans for first unit of new brewing plant at 1629-31 Third Avenue, seven and 11 stories, 100 x 200 ft., for refrigerating, storage and distributing service. Cost \$450,000 with equipment. Other units will be built later. Ely Jacques Kahn, 2 Park Avenue, is architect.

James R. Smith Mfg. Corp., Lindenhurst, L. I., has been organized by James R. Smith, Lindenhurst, and John J. Mead, Sayville, L. I., to manufacture heating plant equipment, parts, etc.

National Biscuit Co., 449 West Fourteenth Street, New York, has filed plans for five-story addition to plant at Tenth Avenue and Fifteenth Street, 100 x 206 ft., with foundations for five additional floors later. Part of unit will be equipped for storage and distributing service. Cost about \$500,000 with equipment. Louis Wirsching, Jr., is company architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 17 for one air-conditioning system (Schedule 9396), quantity of industrial thermometers (Schedule 9408) for New York Navy Yard.

Standard Gas & Electric Co., 111 Broadway, New York, operating electric light and power, and gas properties in different states, has authorized fund of \$8,486,406 for extensions and improvements in power plants, transmission lines and other electrical properties, and \$1,896,464 for similar work, including pipe lines, etc., in gas divisions.

Hupfel Brewery, St. Ann's Avenue and 161st Street, New York, has plans for remodeling adjoining building for new bottling, storage and distributing plant. Cost over \$80,000 with equipment.

T. R. Brien Heater Co., Hoosick Falls, N. Y., recently organized to manufacture hot air furnaces, parts, etc., has taken over part of former local plant of Walter A. Wood Co. for new works, beginning operations this month.

Public Works Officer, Navy Yard, New York, asks bids until Jan. 18 for one-story addition to Building No. 4, cost \$32,000 (Specification 7194); until Feb. 8, one crane for same shop building (Specification 7197).

Ginsberg, Barnes & Conway, Inc., Bronx, N. Y., has been organized by Frank I. Ginsberg, 923 Walton Avenue, Bronx, and Donald D. Barnes, 37 Chatham Road, New Rochelle, N. Y., to manufacture machinery and parts.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Jan. 18 for one turbo-alternator for Brooklyn Navy Yard (Specification 7175).

Brooklyn Union Gas Co., 176 Remsen Street, Brooklyn, plans extensions and improvements in one-story pumping plant, 85 x 110 ft. on Fifty-seventh Avenue. Cost over \$25,000 with equipment.

Continental Paper & Bag Corp., 220 East Forty-second Street, New York, manufacturer of paper bags and containers, has leased about 60,000 sq. ft. in former plant of Durant Motor Co., Elizabeth, N. J., for new plant. Company will remove works at foot of Fifty-first Street, Brooklyn, to new location, and increase capacity.

Commissioners of Palisades Interstate Park, 141 Worth Street, New York, Leib Deyo, general purchasing agent, asks bids until Jan. 16 for copper-bearing chain link wire fencing, complete with line posts, corner posts, etc.

New Jersey Iron & Steel Construction Co., Passaic, N. J., care of Martin Klughaupt, 625 Main Avenue, representative, has been organized by Melton A. Croson, Passaic, and associates to manufacture fire escapes and other iron and steel specialties.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 17 for one precision measuring machine (Schedule 9403) for Philadelphia Navy Yard.

Kohler Co., Kohler, Wis., manufacturer of plumbing equipment and supplies, has leased one-story building at F Street and Atlantic Avenue, Philadelphia, 68,000 sq. ft. floor space, and will remodel for new factory branch, storage and distributing plant.

T. W. & C. B. Sheridan Co., 135 Lafayette Street, New York, manufacturer of machinery and parts, has purchased plant and assets of

American Assembling Machine Co., Easton, Pa., manufacturer of printing plant machinery, from receiver for \$100,000. Purchasing company will operate plant for same line of production, including stitchers, binders, trimmers, wrapping machines, etc.

Adam Scheidt Brewing Co., Norristown, Pa., has plans for an addition. Cost over \$60,000 with equipment. Henry P. Friend, Norristown, is architect.

Horseheads Foundry Corp., Horseheads, N. Y., recently organized by W. J. Gibney, Elmira, N. Y., and associates, has leased part of plant of Reeves Foundry Co., Horseheads, for manufacture of iron and other metal castings.

Chasm Power Co., Chateaugay, N. Y., plans rebuilding part of power house recently destroyed by fire. Loss about \$40,000 with equipment. Company is operated by Associated Gas & Electric Co., 61 Broadway, New York.

Harrison Radiator Corp., Lockport, N. Y., manufacturer of automobile radiators, etc., has increased production schedule, giving employment to about 1300 persons.

◀ CENTRAL DISTRICT ▶

Hyvis Oils, Inc., Warren, Pa., has been organized to take over and operate two local oil refineries of Conewago Refining Co., and will carry out expansion and improvements. Harry R. Lewis, heretofore president of last noted company, heads new organization.

Zurn Mfg. Co., Erie, Pa., manufacturer of steam fittings, plumbing supplies, etc., has adopted full time schedule. Company has recently secured three sizable contracts from Government.

Erie Brewing Co., Erie, Pa., is planning plant expansion and modernization program. Cost over \$100,000 with machinery.

Wheeling Structural Steel Co., Martin's Ferry, Ohio, has work under way on one-story addition and will remove equipment from works at Wheeling, W. Va., to this plant, where production will be expanded and concentrated. Wheeling plant will be closed permanently.

City Council, Youngstown, Ohio, is planning new municipal airport at Racecon and Four Mile Run Roads, to include hangars, repair shops, and other field units. Cost over \$100,000 with equipment. G. M. Cook is city engineer.

Sun-Glow Industries, Inc., Mansfield, Ohio, manufacturer of refrigerators, etc., is increasing production schedules at Mansfield, Fredricktown and Hillsboro, Ohio, plants, adding over 800 men.

W. O. Larson Foundry Co., Cleveland, recently organized under direction of Thompson, Hine & Flory, Guardian Building, representative, has purchased a plant unit of Osborn Mfg. Co. at Grafton, Ohio, for production of iron castings. W. O. Larson, heretofore manager of foundry department of Hill Clutch Machine & Foundry Co., Cleveland, is president of new company.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until Jan. 16 for one motor-driven internal grinder (Circular 297); until Jan. 17, piping and control valves for extension of carburetor box vacuum line in basement of power plant laboratory (Circular 312); until Jan. 18, tail post fittings, tail post fuselage reinforcement plates and channels (Circular 308), one vapor cleaning machine (Circular 310); until Jan. 23, one motor-driven milling machine (Circular 304).

Dayton Pneumatic Tool Co., Dayton, Ohio, care of H. P. Lilliamson, Mutual Home Building, representative, has been organized by I. I. Hauer and W. L. Pearson, Dayton, to manufacture pneumatic tools and parts.

Renner Products Co., 275 North Forge Street, Akron, Ohio, E. C. Deibel, president, is considering expansion and modernization program at brewing plant. Cost over \$100,000 with machinery.

Belmont Stamping & Enameling Co., New Philadelphia, Ohio, has resumed production, giving employment to regular working quota of 280 operatives.

Shell Petroleum Corp., Shell Building, St. Louis, will carry out expansion and improvements at oil refinery at Hammond, Ind. Cost over \$500,000 with equipment.

Period Cabinet Mfg. Co., New Albany, Ind., plant closed about two years ago, has been acquired by James L. Woods, Bloomington, Ind., and associates, who will remodel for manufacture of radio cabinets and equipment, giving employment to more than 100 men.

Blatz Brewing Co., North Broadway, Milwaukee, has taken over building at 55 South Oriental Street, Indianapolis, for new branch bottling and packing works.

Great States Co., Inc., Shelbyville, Ind., manufacturer of power and hand-operated lawn mowers, parts, etc., is developing capacity production in assembling and other departments at local plant, recently removed from Hammond, Ind.

Municipal Service Commission, Wyandotte, Mich., asks bids until Jan. 23 for municipal electric light and power plant. Cost over \$125,000 with equipment. Froelich & Emery Engineering Co., Second National Bank Building, Toledo, Ohio, is consulting engineer.

Department of Public Works, City Hall, Detroit, plans early call for bids for new pumping plant for municipal water service. Cost about \$22,000 with machinery.

Walker Products Co., Center Line, Mich., is planning expansion and modernization in brewing plant. Cost about \$60,000 with machinery.

Davis-Grove Corp., New Center Building, Detroit, has been organized by George L. Davis, 10340 Oakland Avenue, and associates, to manufacture engines, parts and kindred equipment.

Department of Public Works, Grand Rapids, Mich., is considering erection of a municipal electric power plant. Cost about \$80,000 with equipment.

Herbrandt Co., Fremont, Ohio, manufacturer of drop forgings and wrenches, has been placed in receivership, Stanley F. Boyer, president of company, being named as receiver. Purpose of receivership it was stated, is to preserve rights of company pending a reorganization. Receiver has been authorized to keep plant in operation.

◀ SOUTH ATLANTIC ▶

Board of District Commissioners, District Building, Washington, has awarded general contract to Frank M. Weaver & Co., Inc., Washington, for one-story foundry at district reformatory, Lorton, Va. A. L. Harris, District Building, is architect for board. Bids are being asked by board until Jan. 16 for laboratory equipment for public schools.

City Council, Martinsville, Va., is considering transmission line to Danville, Va., where negotiations are under way for power supply for municipal service. Cost over \$40,000.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Feb. 1 for air-conditioning system at Naval Operating Base, Pearl Harbor, T. H. (Specification 7165); until Feb. 8, addition to mechanical shop at Naval Air Station, Coco Solo, C.Z., 100 x 124 ft., and 50 ft. high (Specification 7111).

Atlantic Coast Line Railway Co., Wilmington, N. C., is reopening repair shops at Rocky Mount, N. C., reinstating about 700 men.

General Purchasing Officer, Panama Canal, Washington, asks bids until Jan. 27 for wood-working machinery, capstans, electric motors, transformers, insulated cable, split connectors for splicing cable conductors, water meters and other equipment (Schedule 2831).

Weaver Roller Shops, Inc., Lincolnton, N. C., has been organized by W. E. Payseur and Claude L. Warlick, Lincolnton, to manufacture spinning frame rollers and other textile mill equipment.

City Council, Radford, Va., has authorized a bond issue of \$150,000, for erection of a municipal hydroelectric power plant on Little River.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 17 for nails, tacks and spikes (Schedule 9413), brass and copper pipe and copper tubing (Schedule 9379), wire cloth (Schedule 9366) rivets, burrs and washers (Schedule 9416), one portable center crank pin turning machine (Schedule 9402), cotter pins, taper pins and esutchons (Schedule 9409), searchlights and spare parts (Schedule 9411); until Jan. 24, electric wire and cable (Schedule 9401), welding rods and electrodes (Schedule 9421), insulated wire and cable (Schedule 9394), six motor-driven lubricating oil purifiers and spare parts (Schedule 9452), all for Eastern and Western navy

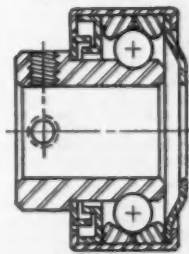


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◀ NEW ENGLAND ▶

Boston Wire Stitcher Co., East Greenwich, R. I., manufacturer of wire stitchers, staples and kindred products, has purchased plant and assets of Bliss-Latham Corp., Niagara Falls, N. Y., manufacturer of kindred products, including paper box-manufacturing machinery, parts, etc. Plant will be removed to East Greenwich works, where production will be concentrated.

Worcester Hydromatic Machine Co., Inc., Worcester, Mass., has been organized by Frederick J. Barry and Allen J. Tupholme, president and vice-president, and Paul Sibley, 14 Suburban Road, treasurer, to manufacture special machinery and parts.

Superintendent of Lighthouses, 156 Federal Street, Portland, Me., has awarded general contract to Modern Construction Co., 61 Court Street, Boston, for new two-story shop, 40x100 ft., at Lighthouse Station, South Portland.

Electrolux Mfg. Co., Greenwich, Conn., has been organized by officials of Electrolux, Inc., 500 Fifth Avenue, New York, to take over and occupy former plant of Dalton Machine Tool Co., South Beach, Conn., recently acquired by parent organization, for manufacture of electric cleaners, electric polishing machines and kindred products.

Mayhew Steel Products Co., Shelbourne Falls, Mass., operating under receivership for several months, has been purchased at public sale by J. B. Parsons, heretofore vice-president of company, and associates. New owners plan reorganization of company and operation of plant soon.

Patton Mfg. Co., Inc., Springfield, Mass., has been organized by Kirby S. Baker and Charles D. Sloan, 1200 Main Street, to manufacture metal products.

◀ MIDDLE WEST ▶

Wilson & Co., 4100 South Ashland Avenue, Chicago, meat packers, have plans for extensions and improvements in power plant, including additional equipment. Cost over \$100,000 with equipment.

Grigsby-Granow Co., 5801 Dickens Avenue, Chicago, manufacturer of radio equipment, electric refrigerators, etc., is increasing production in refrigerator division and will re-instate about 2000 workers this month.

Bureau of Reclamation, Denver, asks bids until Jan. 20 for four gate hoists with shafts and stems, four gate stems with collars, nuts, etc., one line shaft, two radial gate hoist line shafts and one miter gear set (Specification 688-D); until Jan. 27, eight welded plate steel cylinder gates, 32-ft. diameter, and 10 ft. high, with semi-steel entrance liners, welded plate steel nose, liners, semi-steel and cast steel throat liners, for intake towers at Hoover Dam, Boulder City, Nev. (Specification 541).

City Council, Fort Collins, Colo., is considering a report from Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., consulting engineer, for a municipal electric light and power plant, with distributing system. Cost \$700,000 with equipment.

Chicago & North Western Railway Co., 400 West Madison Street, Chicago, has resumed operations at local car and locomotive repair shops, after curtailment of about 18 months, recalling over 400 men.

Keyless Lock Corp., 1601 Orrington Avenue, Evanston, Ill., has been organized by Byron S. and Owen L. Coon, Evanston, to manufacture special automobile locks and locking devices.

Liquefied Natural Gas Corp., Foshay Tower Building, Minneapolis, has plans for new gas distributing plant at Tracy, Minn., for service at that place, Westbrook, Currie and neighboring towns. Work will begin in about 60 days. Cost over \$45,000 with equipment, pipe lines, etc. H. H. Henley is engineer.

Illinois Oil Co., Rock Island, Ill., contemplates extensive improvements to its refinery in Oklahoma.

Hammes Mfg. Co., Racine, Wis., has been organized with \$10,000 authorized capital to manufacture tools, dies, mechanical devices and machinery. Production plans have not yet been made public. Principals are Michael A. Hammes, Frank J. Born and Henry

Gloede, Jr., who are represented by Ellis J. Hughes, attorney, 1419 Washington Avenue, Racine.

Pabst Corp., 917 West JunEAU Avenue, Milwaukee, formerly Pabst Brewing Co., is placing contracts amounting to \$457,000 for remodeling and re-equipping several main structures. Work includes 200 steel aging tanks, \$200,000; grain drying equipment, \$30,000; bottling machinery, \$58,000; keg racking, \$28,500; power plant, \$10,000. Fred Pabst is chairman.

Cary Mfg. Co., Waupaca, Wis., manufacturer of oil burners and other heating equipment, intends to build new machine shop as replacement of plant, 40 x 70 ft., four stories, destroyed by fire Dec. 29 with loss of \$125,000. Practically all equipment was damaged beyond repair. Foundry, office and shipping departments were only slightly damaged.

◀ SOUTHWEST ▶

Southern Central Co., Little Rock, Ark., care of J. T. Roach, 522 East Markham Street, recently organized by Mr. Roach and associates to manufacture writing tablets and kindred specialties, plans establishment of new paper converting plant at Memphis, Tenn. Cost about \$60,000 with equipment.

Circle Packing Corp., 317-25 Winstanley Avenue, East St. Louis, Ill., meat packer, will soon begin superstructure for two-story addition, 66 x 76 ft. Cost about \$25,000 with equipment. Menges & Mange, Inc., 3014 Chouteau Avenue, St. Louis, are architects.

Oklahoma Boiler & Welding Works, Inc., Oklahoma City, Okla., has been organized by C. H. Tredway, J. E. Rogers, 921 N. W. Fourth Street, and associates, to manufacture boilers and other plate products.

Municipal Water and Electric Department, Carthage, Mo., C. Hoen, general superintendent, plans installation of a 500,000-gal. steel tank on 95-ft. steel tower, in connection with extensions and improvements in municipal waterworks.

United States Engineer Office, Kansas City, Mo., asks bids until Jan. 16 for one marine type gasoline engine (Circular 429).

Board of Education, Hannibal, Mo., plans manual training department in new two and three-story and basement senior high school, for which superstructure will soon begin. Cost \$265,000. Felt, Dunham & Kriehn, 300 West Forty-seventh Street, Kansas City, Mo., are architects.

Common Council, Edcouch, Tex., is considering installation of pumping machinery and auxiliary equipment in connection with extensions in municipal waterworks. Bond issue of \$36,500 has been voted for work.

City Packing Co., Fort Worth, Tex., meat packer, plans rebuilding part of plant recently damaged by fire. Loss about \$40,000 with equipment.

Dallas Farmers Public Market Co., Republic Bank Building, Dallas, Tex., recently organized, plans installation of ice and refrigerating machinery, conveying, loading and other equipment in new public market building, 100 x 150 ft. Fund of \$187,500 has been secured for project. John J. Harden is president.

Wheeler Roller Corp., Smith-Young Tower, San Antonio, Tex., has been organized to manufacture high speed surface rollers. Bart Moore, Jr., is president, and Fred Sendall, secretary-treasurer. Incorrect reference was made to this concern as Wheeler Boiler Corp. in *The Iron Age*, Dec. 22.

◀ SOUTH CENTRAL ▶

United States Engineer Office, Louisville, asks bids until Jan. 27 for construction of lock and dam No. 1, Barren River, at Greencastle, Ky., including steel forgings, steel and iron castings, steel reinforcing rods, four mitre gate and four butterfly valve operating machines, etc.

R. J. Alshire Oil Co., New Orleans Bank Building, New Orleans, plans new sulphur mining works at New Iberia, La., consisting of three one-store units, each about 70 x 140 ft. Cost over \$100,000 with machinery. Lawrence O'Donnell is company engineer in charge.

Board of Jefferson County Commissioners, Birmingham, asks bids until Jan. 30 for new sewage disposal plant at Bessemer, Ala. Cost about \$250,000 with equipment. H. H. Hendon, Birmingham, is engineer; Fuller & McClintock, 170 Broadway, New York, are consulting engineers.

Mobile Ship Chandlery Co., Dauphin and Commerce Streets, Mobile, Ala., plans rebuilding part of works recently destroyed by fire. Loss over \$60,000 with equipment.

Common Council, Sulligent, Ala., plans installation of pumping machinery and other equipment, pipe lines, etc., in connection with new waterworks. Cost about \$35,000. Robert L. Totten, Homewood Station, Birmingham, is engineer.

◀ PACIFIC COAST ▶

Anaconda Wire & Cable Co. of California, Inc., 360 Ninth Street, San Francisco, affiliated with Anaconda Wire & Cable Co., New York, is planning expansion at plant at Orange, Cal., including installation of new equipment.

Texas Corp., 829 South Broadway, Los Angeles, plans rebuilding bulk oil storage and distributing plant at Miami, Ariz., destroyed by fire several weeks ago, with installation of steel tanks and other equipment. Cost about \$35,000.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Jan. 25 for eight monorail electric traveling hoists and trolley beams for hangar at Naval Air Station, Sunnyvale, Cal. (Specification 7170); also bids (no closing date stated) for motor-driven gasoline pumps, gasoline storage tanks, light and power manholes, transformers, piping and other equipment for same station (Specification 7161).

San Pedro Boat Building Co., Terminal Island, San Pedro Harbor, Los Angeles, plans rebuilding part of boat and shipbuilding and repair plant recently destroyed by fire. Loss over \$80,000 with equipment.

Columbia Brewing Co., Tacoma, Wash., is planning expansion and modernization program. Cost about \$50,000 with machinery.

Bureau of Supplies and Accounts, Washington, asks bids until Jan. 17 for one motor-driven brake press with equipment (Schedule 9389), two motor-driven radial drills (Schedule 9406) for Puget Sound navy yard; radial ball bearings and thrust ball bearings (Schedule 9367) for Mare Island and Puget Sound yards; until Jan. 24, 6300 helical springs for Puget Sound yard, and 110 open box springs for Mare Island yard (Schedule 9422).

Aerochrome Engine Valve Co., Hollis Street, Emeryville, Cal., manufacturer of aircraft engine equipment, etc., plans rebuilding part of plant, recently damaged by fire. Loss over \$28,000 with equipment.

◀ FOREIGN ▶

Bowaters Paper Co., Ltd., London, England, has plans for new paper and pulp mill at Ellesmere Port, England, for capacity of about 5000 tons a month. Cost over \$1,500,000 with machinery.

Georg von Giesche's Heirs Mining Co., Berlin, Germany, operating a super-phosphate plant at Cawallen, Germany, is planning electrolytic zinc plant at Magdeburg, Germany. Cost over \$100,000 with machinery.

Ministry of Interior, Government of China, Nanking, is planning new steel and iron works near Pukow on Yangtze River, including iron ore operation for raw material supply at Lishan Mountain. Project will cost about \$50,000,000, of which about \$10,000,000 will be used for iron ore property development and mining plant.

Department of Interior, Government of Mexico, Mexico City, is considering new Government shipbuilding and repair works, to include drydocks, shops, power house and other units. Cost over \$750,000 with equipment.

Trade Notes

Simmons Machine Tool Corp. has moved its New York district sales office to a warehouse at 214 Provost Street, Jersey City, N. J. A. J. Weisbecker is district sales manager. Headquarters of the company remain at Albany, N. Y.

Rawlplug Co., Inc., 95 Lafayette Street, New York, manufacturer of screw anchors and holding devices, has removed its Cleveland office and warehouse from 2032 East Twenty-second Street to 1316 West Sixth Street.

Caswell & Starke, Inc., 17 State Street, New York, tin broker, has changed its name to Caswell, Strauss & Co., Inc.

Revere Copper & Brass, Inc., Rome Division, Rome, N. Y., has removed its Pittsburgh office, in charge of Henry S. Rowland, district manager, to 901 Pennsylvania Avenue, N. S.

Babcock & Wilcox Co., 85 Liberty Street, New York, has appointed Fritz Hoving as West Coast district sales manager to assist A. M. Castle & Co., its West Coast agents, in handling seamless steel and alloy tubes and pipe.



ACORN NUTS

Ferry Patented

Stainless Steel Covered

A WONDERFUL OPPORTUNITY to hide unsightly exposed bolt ends by the use of Ferry Patented Acorn Nuts is attracting the attention of engineers throughout the country. The neat, graceful appearance of these Acorn Nuts—their ability to lend a finished appearance to the product—is as great as the cost is small.

THE FERRY STEEL COVERED ACORN NUT

The Ferry Steel Covered Acorn Nut has the advantage of permitting painting, galvanizing, Parkerizing, Sherardizing, Cadmium-plating, Nickel-plating and Chromium-plating, burnishing, polishing and buffing.

THE FERRY BRASS COVERED ACORN NUT

The Ferry Brass Covered Acorn Nut is recommended where Nickel-plating and Chromium-plating on brass is desired. It has the non-corrosive feature which is a strong advantage.

THE FERRY STAINLESS STEEL COVERED ACORN NUT

The Ferry Stainless Steel Covered Acorn Nut is recommended where no plating is desired. It is a stainless steel cover all the way through. It is furnished with steel or brass hexagon nut insert at exceedingly small cost.

Hide Unsightly Exposed Bolt Ends

Write for samples, sizes, styles and prices

THE FERRY CAP & SET SCREW CO., CLEVELAND, OHIO



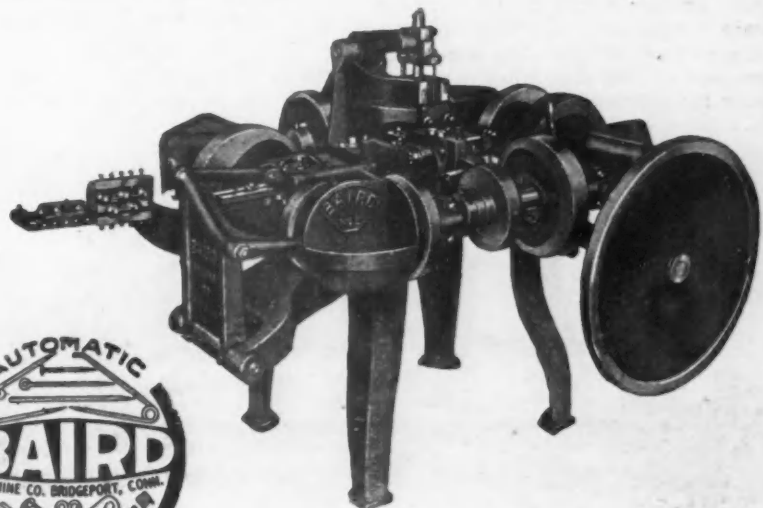
BAIRD WIRE FORMING MACHINES

A coil of flat or round wire is what these machines feed on, but an endless variety of peculiarly formed parts are ejected at the output end.

Everything is automatic—cutting, forming, punching, marking and ejecting. Built in eleven standard sizes for the economical production of almost every type of formed wire parts.

If you have a wire or ribbon metal forming problem — put it up to Baird. And if you think you have "licked" such a problem, check your results with Baird and see if you are getting production in a 1932 manner.

THE BAIRD MACHINE CO.
BRIDGEPORT CONNECTICUT



"Ask BAIRD About It"

Chrome-Nickel Steel for Navy Cast Steel Anchor Chain

(Concluded from Page 101)

ent treatment were given a microscopic examination. Much of the data was useful only in proving the poor effect of certain treatments.

Effect of Quenching in Water

The bars that were quenched in water will be considered first. In the 0.37 per cent carbon heat only two bars cracked when quenched on a falling temperature. These two bars were first annealed. For some unaccountable reason the results obtained by annealing and then heating and quenching are not satisfactory.

The best results were obtained when the bars were first heated to 1650 deg. and then quenched on a falling temperature slightly above the critical range (1550 deg.). On quenching from a higher temperature there was some loss of tensile strength and ductility. Examination of these specimens under the microscope shows the steel to be martensitic after quenching, and converted to troostite and sorbite on tempering. When the steel was tempered at 1000 deg. it contained a troostite-sorbite matrix.

Specimens quenched in hot water gave very good results. The water was heated to 150 deg., as this temperature was considered to be intermediate between cold water and oil. The microscopic structure of the steel is similar to that of the specimens quenched in cold water except there appears to be a slight increase in grain size.

The specimens heated to 1650 deg. and quenched on a falling temperature at 1300 deg. gave very good results also, although not so high as those quenched above the critical range. Quenching at 1250 deg. did not give good results. The specimens quenched at 1300 deg. when examined under the microscope show the rejection

of free ferrite and the carbide as sorbite.

The air-cooled specimens proved very satisfactory. Those cooled from above the critical range do not give any better results than those allowed to cool in the furnace to just above the lower critical and then air cooled. The specimens from the 0.37 per cent carbon steel showed some softening when tempered; however, tests conducted with air-cooled bars from additional heats show that it is not necessary to temper air-cooled bars from heats containing less than 0.42 per cent carbon. The practice is to temper air-cooled bars to relieve any cooling strains.

Results obtained from pulling specimens cut from links are similar to results obtained from bars subjected to the same treatment, although the link specimens do not give quite as high values because of the mass of the link. This is to be expected and must be considered in heat-treating large-size chain.

Small links subjected to high quenching temperatures cracked in every instance when the carbon was above 0.32 per cent. The large links showed no quenching cracks whatever, regardless of the carbon content or the quenching temperature.

The results obtained from the impact tests are not consistent enough to form a basis for a definite conclusion. At the present time there is no standard impact test. Specifications may call for a Charpy, an Izod, a tensile impact, or a repeated impact (fatigue) test, and results cannot be converted from one type to another, although conversion tables have been made claiming to do just this.

From the experiment two treatments were derived. Sizes greater than 1½ in. are heated to 1650 deg.,

cooled in the furnace to 1550 deg., quenched in cold water and tempered at 1100 deg. For sizes less than 1½ in., the treatment consists of heating to 1650 deg., cooling to 1550 deg. in the furnace, and then cooling in air. The air-cooled chain also is tempered at 1100 deg. The time of holding at the quenching and tempering temperatures depends directly upon the size of the chain.

Restyling Service—A New Development in Merchandising

(Concluded from Page 98)

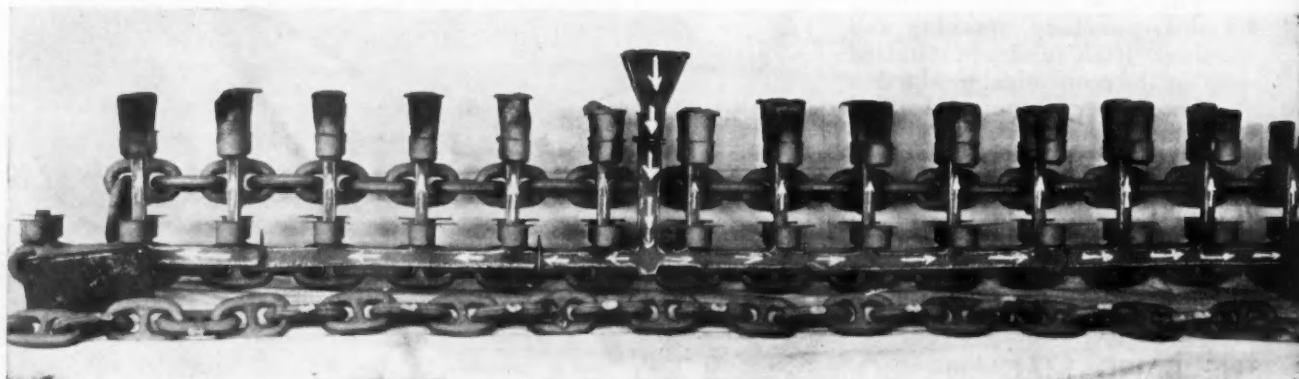
out that way and hence modifications must be made by the stylist.

The next step is to turn the mechanical drawings over to a model maker. The model may be made in the client's own plant, or from modeling clay by a sculptor selected by us, or, even more likely, from wood under the supervision of our engineer.

With the artist's design, mechanical drawings and a model available for inspection, a final conference of artist, client, engineer and service director is held in which the whole problem is gone over for final checking. Frequently the third dimension, as shown in the model, discloses faults not noticeable before. If any modifications are decided upon by the conferees, the mechanical drawings are altered and the artist's design likewise, if the changes are radical.

If the client wishes to have a working model made, still another conference is held to examine it and check its performance. So far, however, this extra step has been found unnecessary.

A styling service of the type just described has the important advantage of leaving no uncertainty as to final cost. There is a definite, fixed cover-all fee for the entire job. Usually one-third of the fee is payable when the artist is hired, one-third when the artist's drawings are finished, and the balance at the final conference for the inspection of the model. All bills are paid by our organization, and we are



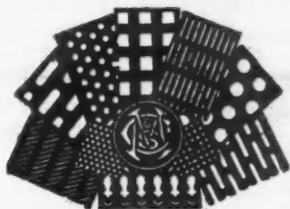
Mold removed after casting one-inch chain.

MUNDT PERFORATED METALS

Large stocks of all metals always in hand ready to punch for any arrangement of perforations.

Sixty-one years of manufacturing perforated metals for every conceivable purpose assures satisfaction.

Write for Catalog of Patterns.



TIN, STEEL, COPPER, ALUMINUM, BRONZE,
BRASS, ZINC, ANY METAL, ANY PURPOSE

CHARLES MUNDT & SONS
50 FAIRMOUNT AVE., JERSEY CITY, N. J.

Cone 4-Spindle Automatics

Are economical and accurate producers of screw machine parts up to 6" diameter 7" milling length. They cut costs, increase production, boost profits.

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Indiana: G. A. Richey, Chamber of Commerce Bldg., Indianapolis, Ind.
New York State: Syracuse Supply Co., Syracuse, N. Y., also Rochester, N. Y.
Pennsylvania: Arch Machinery Co., 1905 Park Bldg., Pittsburgh, Pa.
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Drilling Machinery

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One to Six Spindles

Tapping Attachments and Multiple Heads

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Milling — Grinding — Screw
and Gear Cutting Machines
Machinists' Tools — Cutters and Hobs
Gears Cut to Order

BROWN & SHARPE MFG. CO., Providence, R. I., U. S. A.



A baby's treated hardly more carefully

At every step GOHI is handled as carefully as humanly possible with gloved hands in the inspection room, lifting and lowering of sheets instead of sliding them, extra sheets on top and bottom of piles to rest on the tongs. Why, in the case of electrical and enamelling sheets we even wrap them up, all six sides.

GOHI Sheet Metal has a reputation to maintain. We've made it the very best we know how. And it's to reach you in the same condition—clean, smooth, perfect in every detail—no rust spots, no corrosion, no bent corners, no scratches.

Indicative of the meticulous care and attention given to every operation, there's good reason why GOHI, a Pure Iron Copper alloy, is the one ferrous metal that will meet every condition of wear, weather and fabrication.

Trust your reputation to GOHI and you won't go wrong. More, you'll save time, labor and make certain the results you expect.

The Newport Rolling Mill Company

Newport, Kentucky



GOHI
PRONOUNCED "GO-HIGH"

SHEET METAL

responsible for seeing that costs come within the original estimate. In no case is a client charged more than the fee stipulated in the contract.

If the client wishes it, every one of the steps in the progress of styling is scheduled, a definite date being set for each. Our belief is that by breaking the problem down into logical stages we can bring it through to solution more quickly and more cheaply than would be possible if a manufacturer simply let an artist loose on it.

We have obtained a favorable reaction from our clients, first, because we take the guesswork out of cost and time and insure a practical result in the end, and, secondly, because we translate the artist's drawing into cold-blooded blue prints which they and their engineers can understand and which gives them a definite idea as to whether the design is really practical.

Incidentally the service charge covers styling only. There are no obligations to specify pressed steel or to buy parts from the Youngstown Pressed Steel Co. The fee stands on its own feet and includes a profit.

An interesting by-product of styling is technical improvement. The minute a group sets to work on a problem of styling mechanical improvements invariably follow. Each of the participants is more or less of a creative thinker and benefits from the suggestions of his colleagues. In the restyling of the credit register a marked improvement in technical design grew out of the conferences. In the old product the feet under the leaves of the register had to be adjustable and scratched the base. In the new design an entirely new hinge was devised and the feet were eliminated. Incidentally this suggestion was made by the client.

New Process for Cold Drawing of Metals

(Concluded from Page 99)

elongation of 2 per cent, and a reduction in area of 38.4 per cent. This wire was then de-leaded, cleaned and annealed and then re-coated, after which it was drawn down to 0.040 in. diameter (1.02 mm.) without annealing. Similar results have been obtained on low and high-carbon wire, as well as alloy steel wire such as the chromium, chromium - molybdenum, chromium-silicon, and related alloys.

The Dudzele process allows the ready fabrication of a number of very difficultly workable alloys which are made into tube, rod and wire by cold working processes. It eliminates a large number of the problems encountered when other methods for tube fabrication are employed. The process has stood the test from both the engineering and the economic side of plant operation. It shows considerable savings over ordinary methods and is obviously a cheaper one.

The method produces finishes on the tubing which are superior to those produced by the usual procedure. The finish of a tube and its freedom from corrosion are closely related, in that a smooth surface will be far less readily attacked than a rough one. The process is protected by a number of United States, Canadian and European patents but is available to manufacturers on a license basis.

Research in the Metal-Working Industry

(Concluded from Page 103)

meet changing situations. The results are analyzed in detail in Table 4.

In all there were 309 laboratories from 19 industries that gave sufficient detailed information to lend itself to analysis. These industries include automotive, building, ceramics, chemical, electrical, food, machinery, metal products, drugs, miscellaneous, non-ferrous, oil works, paint, paper, public utility, rubber and textile. Table 5 gives the figures.

We find that, as compared with all industries where 51.3 per cent of the companies reported an increase in dollar expenditures, only 42.2 per cent of the companies reporting from the machinery industry increased their expenditures for research, whereas 50 per cent of the companies in the metal industry increased their dollar expenditure on research in 1931 as compared with 1929. However, if we take the percentage of those that decreased their research expenditures, we find that whereas the average for all industries was 30 per cent the average of the machinery industry was only 26.2 per cent and for the metal industry 30 per cent. In terms of percentage of sale we find that whereas 91 per cent of the companies of all industries maintained or increased their percentage of sales devoted to research, the figures for the machinery and metal industries are 92.5 and 100 per cent respectively.

Some of the companies volunteered the information as to new products which might be developed as a result of research in the near future. A few of the products mentioned in the questionnaires relating to the machinery industry are: Air conditioning of houses, Diesel engines, replacement of cast iron by welded steel, new steam plant equipment, use of wood

and metal substitutes, new systems of refrigeration, auxiliary equipment for printing presses, higher steam pressures, dust, fume and fog collecting equipment, alloy steels, chrome plating, nitriding, high-speed steels and heat treatments of metals.

Similar products mentioned on the questionnaire of the metal products industry are: Increased use of alloys, new metals, new alloys, welding, higher steam pressure, gas turbines and stainless castings.

In a recent study of the 852 firms, the stocks of which are listed on the New York Stock Exchange, 224 were found to have laboratories which were included in the bulletin mentioned above, which lists 1600 research laboratories. This represents more than 26 per cent. If we include those companies which make use of other outside research facilities (university, consulting or government) and eliminate the purely merchandising and holding companies, the percentage becomes still larger.

To carry the matter farther, a survey was made of the latest annual reports of these 224 companies, and it was found that 56 devoted a portion of their annual report to some mention of their research activities. These references vary from a few sentences to several pages. This indicates the position research has attained as one of the fundamental industrial factors to be reported on to stockholders along with finance, markets, operations, labor conditions, general business conditions and outlook.

Conducts Course In Welding Design

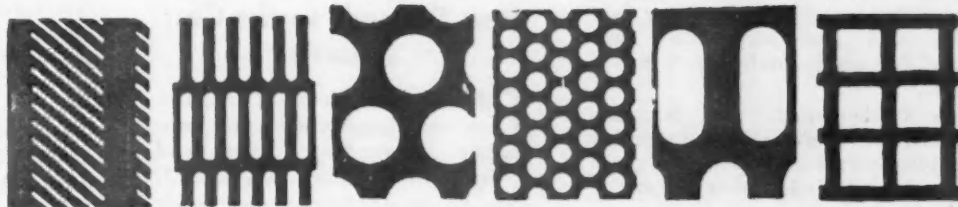
A three-day course in arc welding and theory of design for welded steel construction was held last month at the plant of the American Rolling Mill Co., Middletown, Ohio, under the direction of E. W. P. Smith, consulting engineer, Lincoln Electric Co., Cleveland. Designing engineers, electrical engineers, maintenance men and the various department heads of the rolling mill company attended. Subjects covered included arc welding generators, electrodes, calculation of stresses in welded joints, substitution of welded steel for castings and redesign for welded construction. The lectures were supplemented by demonstrations in the shop.

TABLE 5—CHANGE IN RESEARCH EXPENDITURES OF 1931 COMPARED WITH 1929

| | In Dollars | | | In Per Cent of Sales | | |
|--------------------|--------------------------|--------------------|----------------|--------------------------|--------------------|----------------|
| | All Industries, Per Cent | Machinery Industry | Metal Industry | All Industries, Per Cent | Machinery Industry | Metal Industry |
| Increased | 51.3 | 42.2 | 50 | 75.3 | 78.2 | 90 |
| Made no change.... | 18.7 | 31.6 | 20 | 15.7 | 14.3 | 10 |
| Decreased | 30.0 | 26.2 | 30 | 9.0 | 7.5 | .. |

All sizes and shapes of holes. Any kind of metal for whatever purpose desired. Our facilities are unequaled. Send us your inquiries.

Perforated Metal Screens



The HARRINGTON & KING PERFORATING CO.

5657 Fillmore St., Chicago, Ill., U. S. A.

New York Office: 114 Liberty St.

THOMAS

SPACING MACHINE COMPANY
PITTSBURGH

FABRICATING MACHINERY

Save All Forgings, 70% of Grinding

FOR every operation of Lathe, Planer, Slotter and Shaper. Over 10 modifications of shape and size.

ARMSTRONG TOOL HOLDERS

Catalog B-21 sent on request.

ARMSTRONG BROS. TOOL CO., CHICAGO



Look for this Mark
—the quality sign of
"The Tool Holder People"



Landis makes a complete line of threading equipment. Depend upon it, if you have a threading operation, Landis has a machine, die head or tap that will handle the job to better advantage.

Write today for literature.

LANDIS MACHINE CO., Inc.
Waynesboro, Penna., U. S. A.

Emery Wheel Dressers

Two Sizes **CUTTERS** Nos. 1-2

We make the regular Huntington (Pattern) for all sizes. Roughing for Nos. 1 and 2. Paragon for No. 1 only.

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ABRASIVE SURFACE GRINDER

Either Horizontal or Vertical Spindle Type Countershaft or Motor Drive

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**Cutting Off
Machines for
Sawing All Kinds
of Metals**

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FRONT AND GIRARD AVE. PHILADELPHIA, PENNA.

"NEW PROCESS" PUNCHES

outlast other makes due to the high grade steel used and proper heat treatment which insures uniformity.

Shipped on Approval
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Self Opening Die Heads
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Receding Chaser Taps
Solid Adjustable Die Heads
Chaser Grinders
Threading Machines

THE GEOMETRIC TOOL COMPANY

New Haven, Conn.

If it is a screw thread, Geometric has the tool to cut it.

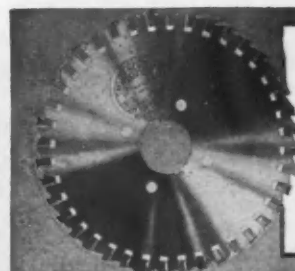
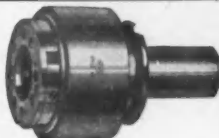
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DIE HEAD**

CUT THREADS
BETTER
QUICKER
CHEAPER

Best and Styles for All Machines
THE EASTERN MACHINE SCREW CORP.
21-41 Barclay St., New Haven, Conn.

Pacific Coast Representatives:

Los Angeles, A. C. Behringer, 313-316 Commercial St., Los Angeles, Cal.
San Francisco, A. H. Coates Co., 1142 Howard St., San Francisco, Cal.



ONLY the cutting speed of machine and nature of material worked, limit the producing powers of these saws. Specially treated high speed steel teeth are inserted into a practically indestructible body. Sizes 10 to 60 inches in diameter. Write for prices and catalog.

The Tabor Mfg. Co.
Philadelphia, Pa.

TAYLOR NEWBOLD
INSERTED TOOTH
COLD SAWS

Improved Materials Widen Markets—II

(Concluded from Page 105)

case process for the heat treatment of medium carbon alloy transmission gears. Greater strength, greater case depth, and smoother action are claimed for gears treated by this new method.

The Carborundum Co., Niagara Falls, N. Y., reports having developed a lapping abrasive with special soft acting characteristics intended for the finishing of gears.

Better Materials Feature Ball Bearing Progress

THE increasingly severe demands on the load-carrying capacities and precise operation of ball bearings in present-day installations have involved the continual development and improvement in alloy steels and the adoption of extreme standards of accuracy throughout the manufacturing processes.

Our experience has established the carbon chromium steel as the most suitable for ball bearings. Balls and rings must be hard and tough to resist the high specific pressures of present service demands. The stress of the pressure area under normal load is frequently in excess of 2000 lb. per sq. in. A steel of high carbon content is brought to the required hardness and then tempered to relieve stresses, the temperature of tempering being kept low enough to avoid reducing the hardness appreciably after quenching. Generally speaking, the harder the material the higher the load-carrying capacity of the bearing, but hardness alone is not sufficient to withstand the high fatigue stresses to which the steel is subjected in a ball bearing under load. The principal object of the chromium addition is to facilitate sufficiently deep hardening. A steel with greater carbon content would be hard only on the surface.

Failures of balls and races under test and in service can often be attributed to excess slag inclusions. Therefore, the most important step in attempting to improve the carrying capacity is to select a steel as slag-free as possible and to control its quality continuously by microscopic examination. It has been frequently suggested that certain alloys, other than chromium, be added to ball bearing steel to increase carrying capacities. However, we feel it is not advisable to hurry to other alloys in ball bearing steel which is subjected to exceedingly high fatigue stresses. We feel the metallurgical purity, i.e., the freedom from large slag inclusions, plays a more important part than the chemical composition, and the requirements in this respect are much more exacting than for other steels in general use. Case hardening is also practiced by some manufacturers and by proper control can give fairly satisfactory results, but it cannot be claimed that the consistency in pro-

New Demands on the Gear Industry

THE manufacturers of machinery and equipment are constantly demanding gears and pinions of greater tough-hardness, of greater impact and shock resistance, and of closer limits in dimensions for more quiet running. This necessitates continued research and development by the gear manufacturer in the selection of new steels and in the development of new or modified heat treatments to meet the newer demands for gears of super-physical properties to withstand greater tooth loads and higher speeds.

Our research department has developed a process whereby higher ductility and greater impact values for the same Brinell hardness are obtained in the cores and roots of gear teeth. This is obtained through improvements in the heat treating process, and through improved specifications on steel quality and on upset forgings.

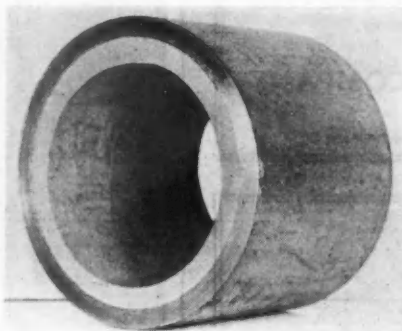
Several 18,000-lb. large rolling mill pinions of carbon-vanadium and chrome-vanadium steels were successfully hardened to 450-500 surface Brinell with a negligible amount of distortion. These were for use on steel mill equipment.

T. I. PHILLIPS

Works Manager, Nuttall Works
Westinghouse Electric & Mfg. Co.

duction approaches that obtained with deep hardening where chromium steel is used.

When ball bearing steel is required for the forging of balls or rings, it



Greater resistance to chemical action in pipes is provided by a cement lining developed during 1932.

is delivered with a micro-structure of lamellar sorbite and cementite boundaries. Most material, however, in the form of bar or tube, is delivered in the annealed condition for the automatic machines, and, in any case, before being subjected to hardening, the material must have a structure of granular pearlite. All forged material is, therefore, annealed before hardening.

Improvements of equal importance to the high quality of steel have also been achieved in our manufacturing processes and it may be said that the precision and accuracy of present-day ball bearings is probably unequaled in any other commercial product. To maintain this extreme degree of accuracy involves numerous processes and final inspections. Special measuring instruments have been developed to facilitate these inspections, most of which are calibrated to determine tolerances within one ten-thousandths of an inch. Some idea of this may be gained from the case of a single-row radial-type bearing in which the number of inspections for dimensions, from the raw materials to the finished product, was approximately 30. In addition to the extreme accuracy of dimension, fine finish of balls and races is essential in order to obtain perfect uniformity of contact and load distribution. To obtain this perfection of finish involves three or four supplementary lapping and polishing operations after finish grinding.

Federal Bearings Co.
(Poughkeepsie, N. Y.)

"Housing Objectives and Programs," 372 pages, is the eleventh and final volume of a series of publications covering the President's Conference on Home Building and Home Ownership. This edition covers reports of correlating committees on standards and objectives; research; legislation and administration; education and service; organization programs, local and national, and technological developments. Addresses by President Hoover, at the opening session of the conference, and by Dr. Ray Lyman Wilbur, at the closing session in which he made a general summary of the work of the committees, are included. Copies of this volume as well as of others in the series can be obtained at \$1.15 each from the President's Conference on Home Building and Home Ownership, New Commerce Building, Washington, with checks payable to James Ford, editor.

Pittsburgh Lectromelt Furnace Corporation, P. O. Box, 1125, Pittsburgh, recently installed a three-ton usual operating charge size Lectromelt furnace at the plant of Sorel Steel Foundries, Sorel, Quebec, Canada, for basic operation on manganese steels, alloy steels and plain carbon foundry steels. This furnace, which was installed as a converter replacement, averaged 600 kwh. a ton on its first 10 heats.